

# creative computing

May 1979  
vol 5, no 5  
\$2.00

*#1 magazine of computer applications and software*

---

## Word Processing

- Point and consider before buying
- Evaluations of six systems

---

## How to Write a User-Oriented Program

---

## Computer Games:

- Cribbage
- Mille Bornes

---

## PET Graphics Explained

---

## Amortization Schedules

---

## TRS-80 Column

---

## 87 New Products!

---

## Electronics at the 1979 Toy Fair

---

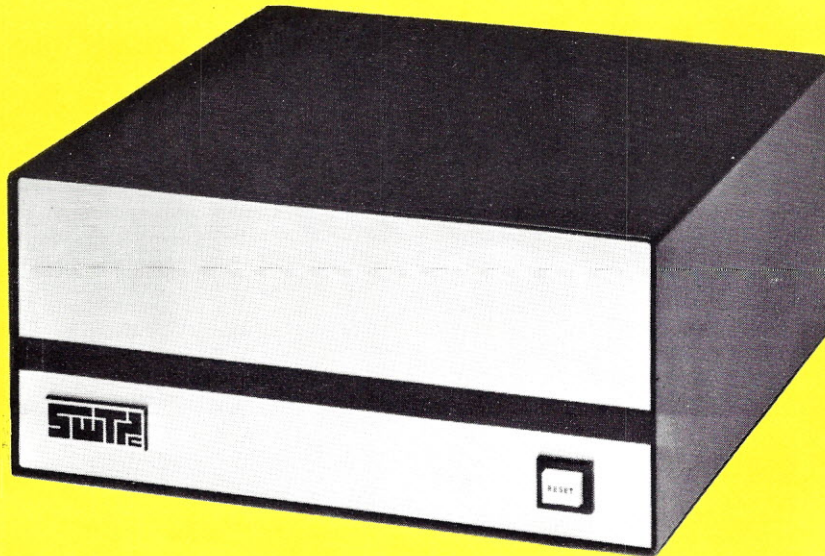
## PILOT : Language for Everyone

---





# The World's Most Powerful 8-Bit Microcomputer



## Featuring the World's Most Powerful 8-Bit MPU - The Motorola MC-6809

Welcome to a whole new world of microcomputing. Here at last is a microcomputer with all the speed and power that you have wished for. The MC6809 is an exciting new concept in microprocessors that fills the gap between 8- and 16-bit machines. It provides the power of 16-bit instructions with the economy of 8-bit architecture.

The MC6809 has more addressing modes than any other 8-bit processor. It has powerful 16-bit instructions, and a highly efficient internal architecture with 16-bit data paths. It is easily the most powerful, most software efficient, and the fastest 8-bit general purpose microprocessor ever.

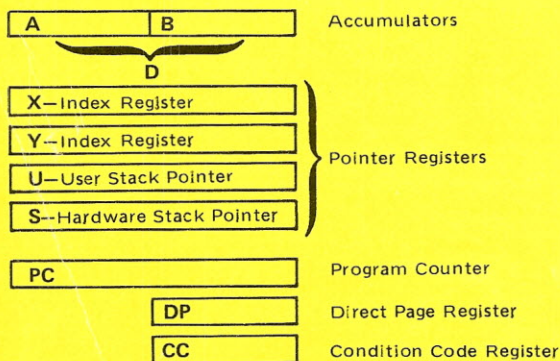
The greatest impact of the Motorola MC6809 undoubtedly will be software related. Ten powerful addressing modes with 24 indexing sub-modes, 16-bit instructions and the consistent instruction set stimulate the use of modern programming techniques. Such as structured programming, position independent code, re-entrancy, recursion and multitasking.

A memory management system with extended addressing designed into the bus system controls up to 256K bytes of RAM memory. The dynamic memory allocation system, which is part of the multitasking DOS, allocates available memory in as small as 4K blocks.

The MC6809 system is the only 8-bit processor designed for the efficient handling of high-level languages. New addressing modes, a consistent instruction set and easy data manipulation on stacks allows the efficient execution of block-structured high-level code as generated by a compiler like PASCAL.

MP-09 Processor Card .....\$ 195.00  
68/09 Computer w/48K .....\$1,500.00

### 6809 PROGRAMMING MODEL



SOUTHWEST TECHNICAL PRODUCTS CORPORATION  
219 W. RHAPSODY  
SAN ANTONIO, TEXAS 78216 (512) 344-0241





# Here's how you can be fully computerized for so much less than you thought

BUSINESS — EDUCATION — ENGINEERING — MANUFACTURING

We are pleased to announce the first professional time-sharing system in the microcomputer field.

Naturally, it's from Cromemco.

This new multi-user system will do all of the tasks you usually associate with much more expensive time-sharing computers. Yet it's priced at an almost unbelievably low figure.

Look at these features:

- You can have up to 7 terminals plus a fast, 132-column line printer
- You can have a large system RAM memory that's expandable to 1/2 megabyte using the Bank Select feature
- Each user has an independent bank of RAM
- You can have floppy disk storage of up to 1 megabyte
- You have confidentiality between most stations
- And, make no mistake, the system is fast and powerful. You'll want to try its fast execution time yourself.



## PROGRAMMERS LOVE OUR BASIC

This new system is based on Cromemco's well-known System Three Computer and our new Multi-User BASIC software package.

Programmers tell us that Cromemco Multi-User BASIC is the best in the field. Here are some of its attractions:

- You can use long variable names and labels up to 31 characters long — names like "material on order" or "calculate speed reduction."
- You get many unusual and helpful commands that simplify programs and execution — commands such as PROTECT, LIST VARIABLES, NOLIST, and many more.

- No round-off error in financial work (because our BASIC uses binary-coded decimal rather than binary operation). And we've still been able to make it FAST.
- Terminals and printer are interrupt-driven — no additional overhead until key is pressed.
- The conveniences in this Multi-User BASIC make it much easier to write your own application software.
- A line editor simplifies changes.

## BENCHMARK IT — NOW

In the final analysis, the thing to do is see this beautiful new system at your dealer. See its rugged professional quality. Evaluate it. Benchmark it for speed with your own routine (you'll be agreeably surprised, we guarantee you).

Find out, too, about Cromemco's reputation for quality and engineering.

Look into it now because you can have the capabilities of a fully computerized operation much quicker and for much less than you ever thought.



**Cromemco**  
i n c o r p o r a t e d

Microcomputer Systems

280 BERNARDO AVE., MOUNTAIN VIEW, CA 94040 • (415) 964-7400

CIRCLE 114 ON READER SERVICE CARD



**Tinker, Tailor, Soldier, Sailor . . .  
Doctor, Lawyer . . . the Chieftain's here.**

No matter whether you're a serious hobbyist or a serious businessman, the Chieftain 6800 microcomputer with capabilities that surpass the Z-80 is made for you.

Smoke Signal's quality-packed Chieftain I features two 5.25-inch mini-floppy drives and Chieftain II features two 8-inch floppy drives.

Both microcomputers provide 32K static memory, two serial I/O ports, a 2 MHz processor board, a 2K RAM monitor, a nine-slot motherboard with built-in baud rate generator and gold connectors for high reliability. The Chieftain's stylish leather-grained cabinet houses the above with its own cooling fan and regulated power supply.

Every Chieftain is complete with system software and is totally burned-in as well as tested to further insure high reliability.

And it's expandable to 64K memory with up to 2 megabytes floppy disk storage.

So see your nearest Smoke Signal dealer, he'll be glad to show you how to get your wampum's worth. Systems start at \$2,595.



- ☐ Send information on your Chieftain microcomputer  
☐ Send name of nearest dealer

Name \_\_\_\_\_

Address \_\_\_\_\_

Company \_\_\_\_\_

City \_\_\_\_\_

State/Zip \_\_\_\_\_



**SMOKE SIGNAL  
BROADCASTING**

31336 Via Colinas, Westlake Village,  
California 91361. (213) 889-9340

Dealer inquiries invited.



# Hail to the Chieftain

Smoke Signal Broadcasting, 31336 Via Colinas, Westlake Village, CA 91361, (213) 889-9340

CIRCLE 125 ON READER SERVICE CARD



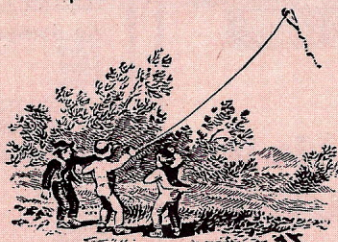
# In This Issue

## articles

- 28 Word Processing Systems** ..... Doliner  
Points to consider
- 67 And Then There Was One** ..... Morton  
Unique series of college computer texts
- 72 How To Hide Your Basic Program** ..... Jaquiss  
Nevison started it. Here's Round 2.
- 76 7167 Bytes** ..... Wuchter  
Making the most of them
- 78 The Computer Lib Pledge** ..... Nelson  
The purpose of computers is human freedom
- 93 Everyone's Language : Pilot** ..... Wilkinson  
The ultimate in simplicity
- 96 User-Oriented Programs** ..... Heuer  
How to write them
- 101 Computer Usage by the Army** ..... Milway

## evaluations & profiles

- 34 PolyMorphic 8813 Word Master** ..... North  
Practice makes perfect
- 36 WPDaisy Word Processing** ..... Hamilton  
Dynamic screen imaging with a regular CRT
- 43 IDSWORD** ..... Heyman  
Comprehensive Word Processing
- 46 Peripherals Unlimited** ..... Hunter  
Text editing on the Apple
- 50 Wordmaster Text Editor** ..... Hart  
Micro-Pro's flexible, powerful system
- 52 Malibu 160 Line Printer** ..... Hallen  
Sturdy, speedy, and beautiful
- 70 PDI IQ Builder** ..... Heuer  
Get smarter with your computer



May, 1979 —  
Volume 5, Number 5

*Creative Computing* magazine is published monthly by Creative Computing, P.O. Box 789-M, Morristown, NJ 07960. (Editorial office: 51 Dumont Place, Morristown, NJ 07960 Phone: (201) 540-0445.)

Domestic Subscriptions: 12 issues, \$15, 24 issues \$28, 36 issues \$40. Send subscription orders or change of address (P.O. Form 3575) to Creative computing, P.O. Box 789-M, Morristown, NJ 07960. Call 800-631-8112 toll-free (in New Jersey call 201-540-0445) to order a subscription (to be charged only to a bank card).

Second class postage paid at Morristown, New Jersey and at additional mailing offices.

Copyright© 1979 by Creative Computing. All rights reserved. Reproduction prohibited. Printed in USA.

## applications ~ games

- 32 Beyond the Text Editor** ..... Kelly  
Data retrieval with the Apple
- 62 Exam Time** ..... Nicastro  
Reading and comprehension tests
- 82 Puzzles & Problems** ..... Townsend  
Six challenging ones
- 104 Cribbage** ..... Yarrow  
Your computer accepts the challenge
- 114 Mille Bornes** ..... Kaapke  
The classic French automobile card game
- 132 Amortization Schedules** ..... Lamb  
For home and business

## fiction & foolishness

- 80 Scavenger Hunt** ..... Payack  
For truth!
- 86 The Counselor** ..... Mancuso  
There's help when your wife leaves you
- 90 A Case For Dreams** ..... Dillon  
Dreams begin with a wish
- 92 Computer Myths Explained** ..... Wolverton  
Latest in the series

## departments

- 6 Notices** .....
- 8 Editorial** ..... Craig  
Spreading the Word
- 10 Input/Output** .....
- 14 Etcetera** .....  
Can You Follow Directions?
- 16 Random Ramblings** ..... Ahl  
Electronics star at 1979 Toy Fair
- 122 Personal Electronic Transactions** ..... Yob  
All about PET graphics
- 129 TRS-80 Strings** ..... Gray
- 134 Compleat Computer Catalogue** .....  
Here are 87 new products for you!
- 160 Compendium** ..... Todd and Lenzen  
Computers are shaping our lives
- 164 Book Reviews** ..... Gray
- 168 Index to Advertisers** .....

The cover photograph is by Jerry Begin.



Publisher **David H. Ahl**

Editor **John Craig**

Managing Editor **Burchenal Green**

Associate Editor **Steve North**

Contributing Editors **Frederick Chesson**

**Margot Critchfield**

**Thomas W. Dwyer**

**Bill Etra**

**Louise Etra**

**Lee Felsenstein**

**Stephen B. Gray**

**Ed Hershberger**

**Arthur I. Karshmer**

**Theodor Nelson**

**Trish Todd**

**Alvin Toffler**

**Karl Zinn**

Art Director **Nils Lommerin**

Production Manager **Robert Borrell**

Editorial Assistant **Cherie Lenzen**

Typesetter **Janet Ganzenmuller**

Advertising Sales **Marcia Wood**

Marketing Coordinator **Nancy Wood**

Software Development **Eric VanHorn**

**Randy Heuer**

**Ann Corrigan**

**Jeffrey Yuan**

**Rob Rich**

Business Manager **Betsy Staples**

Bookkeeper **Jeanne Tick**

Retail Marketing **Jennifer Burr**

Customer Service **Ethel Fisher**

Circulation **Debbie Spence**

**Donna Costanzo**

Book Service Supervisor **C.J. Whitaker**

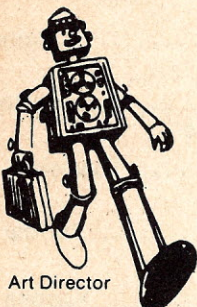
Book Service **Kay McKenzie**

**Barbara Shupe**

**Scott McLeod**

Eastern Penna. Rep. **Paula Mann**

California Rep. **F. Ray Moody**



## Advertising Sales

**Marcia Wood**  
Creative Computing  
51 Dumont Place  
Morristown, NJ 07960

**Western States, Texas**  
**Jules E. Thompson, Inc.**  
1290 Howard Ave.  
Suite 303  
Burlingame CA 94010  
(415) 348-8222

**Southern California**  
**Bert Charlton**  
**Mary Jo Burger**  
2560 Via Tejon  
Palos Verdes Estates, CA 90247  
(213) 378-8361

**Mid-Atlantic, Northeast**  
**Charles Lynch**  
36 Sohler Street  
Cohasset, MA 02025  
(617) 383-6136

**New York, New Jersey**  
**Bob Nelson**  
**Ralph Miller**  
342 Madison, Ave., Room 830  
New York City, NY 10017  
(212) 661-9234

**Midwest**  
**Didier and Broderick**  
P.O. Box 337  
Northfield, IL 60093  
(312) 446-9571

**Southeast**  
**Warren Langer**  
234 County Line Road  
Gilbertsville, PA 19525  
(215) 367-0820

## Foreign Customers

Foreign subscribers in countries listed below may elect to subscribe with our local agents using local currency. Of course, subscriptions may also be entered directly to Creative Computing (USA) in U.S. dollars (bank draft or American Express card). All foreign subscriptions must be prepaid.

Many foreign agents stock Creative Computing magazines, books, and software. However, please inquire directly to the agent before placing an order. Again, all Creative Computing products may be ordered direct from the USA — be sure to allow for foreign shipping and handling.

CANADA	Surface	Air
1-year	\$ 28	n/a
2-year	53	
3-year	77	

RS-232  
Attn: Liz Janik  
186 Queen St. W.  
Toronto, Ontario M5V 1Z1, Canada

ENGLAND		
1-year	13	22
2-year	25	43
3-year	36	63

CREATIVE COMPUTING  
Attn: Hazel Gordon  
27 Andrew Close  
Stoke Golding, Nuneaton CV13 6EL  
England

FRANCE	F	F
1-year	105	180
2-year	200	345
3-year	290	510

SYBEX EUROPE  
14/18 Rue Planchat  
75020 Paris, France

SWEDEN	kr	kr
1-year	105	180
2-year	200	345
3-year	290	510

HOBBY DATA  
Attn: Jan Nilsson  
Fack  
S-200 12 Malmö 2, Sweden

GERMANY	dm	dm
1-year	46	78
2-year	88	152
3-year	128	224

HOFACKER-VERLAG  
Ing. W. Hofacker  
8 München 75  
Postfach 437, West Germany

AUSTRALIA	\$A	\$A
1-year	23	47
2-year	44	92
3-year	64	136

ELECTRONIC CONCEPTS PTY. LTD.  
Attn: Rudi Hoess  
Ground Floor, 55 Clarence St.  
Sydney, NSW 2000, Australia

JAPAN	Y	Y
1-year	4800	9400
2-year	9200	18,400
3-year	13,500	27,200

ASCII PUBLISHING  
305 HI TORIO  
5-6-4 Minami Aoyama, Minato-ku  
Tokyo 107, Japan

PHILIPPINES	P	P
1-year	175	355
2-year	330	690
3-year	480	1,020

INTEGRATED COMPUTER SYSTEMS, INC.  
Suite 118, Limketkai Bldg., Ortigas Ave.  
Greenhills P.O. Box 483, San Juan  
Metro Manila 3113, Philippines

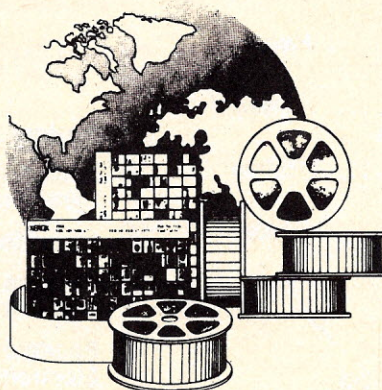
KUWAIT	dinar	dinar
1-year	6.5	11.0
2-year	12.5	21.5
3-year	18.0	31.5

ASCON  
Attn: Salah Zeineddin  
P.O. Box 4052  
Safat, Kuwait

OTHER COUNTRIES	\$23	\$39
1-year	44	76
2-year	64	112

CREATIVE COMPUTING  
P.O. Box 789-M  
Morristown, N.J. 07960, USA

## creative computing



## is Available in MICROFORM

For Complete Information

WRITE :

**University  
Microfilms  
International**

Dept. F.A.  
300 North Zeeb Road  
Ann Arbor, MI 48106  
U.S.A.

Dept. F.A.  
18 Bedford Row  
London, WC1R 4EJ  
England

## OK to Reprint

Material in *Creative Computing* may be **reprinted without permission** by school and college publications, personal computing club newsletters, company house organs, and non-profit publications. Only original material may be reprinted; that is, you may not reprint a reprint. Also, each reprint must carry the following notice on the first page of the reprint in 7-point or larger type (you may cut out and use this notice if you wish):

Copyright © 1979 by Creative Computing  
51 Dumont Place, Morristown, NJ 07960  
Sample issue \$2.00;  
One-year subscription \$15.00

Please send us two copies of any publication that carries reprinted material. Send to attention: David Ahl.



# NorthStar

# Gazer

"Micro-Computer Products  
to Look Up to"

## Horizon Disk Capacity Keeps Growing

The Horizon is now capable of 720K bytes on-line! The Horizon can connect to four double density 5¼" single-sided disk drives. Each of those drives can access 180K bytes of information. A four drive system accesses 720K bytes!

That's capacity you don't usually find in a microcomputer, but there's even more to come! The North Star disk controller board is designed so that two-sided disk drives may be added as soon as they become available from North Star.

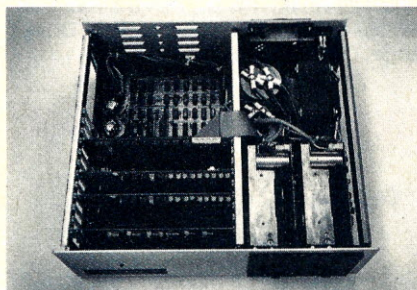
Existing Horizons will accommodate the new two-sided drives so North Star owners can simply add additional drives to up-grade their system. Each two-sided drive will access 360K bytes! That means the maximum on-line disk storage for the Horizon will increase to over 1.4 million bytes!

## New Cabinet for Disk Drives

North Star additional disk drives are now available with the same high quality wood cover as the Horizon computer! The Additional Drive Cabinet (ADC) is designed to accept either one or two drives for the Horizon or for mounting North Star Micro Disk System drives. Like the Horizon, the ADC is available with either wood or blue metal cover. Included is a new power supply capable of powering one or two drives. The ADC is \$129 in kit form. Assembled, with one drive the ADC is \$599, with two drives \$999.

## Pascal Now Available for Horizon

The much-heralded Pascal language is now being offered for use with the North Star Horizon computer. North



Inside view of Horizon with processor board, RAM board, disk controller, two drives, and power supply.

Star, with the co-operation of the University of California at San Diego, is now delivering a Pascal Program Development system. North Star Pascal is ideally suited for developing large programs because of features such as: long variable names, block-structured control statements, and compilation. North Star Pascal is available on 5¼" diskettes for use with the Horizon or Micro Disk System. North Star Pascal will operate with either the Z80 or 8080 microprocessor.

Pascal, including documentation, is available in either single or double density versions for \$49.

An auxiliary Pascal diskette, containing an 8080/Z80 assembler and some additional Pascal utilities, is available for \$29. Complete information is available at your local retail computer store.

## First Double Density, Now Double Memory

The new North Star 32K RAM board (RAM-32) has doubled the memory density of the popular Horizon computer. Available either with the Horizon or other S-100 bus computers, the RAM-32 runs at full speed — no wait states — with the 4 MHz Z80A microprocessor (as well as with slower Z80 and 8080 processors). Addressability of the RAM-32 is switch-selectable in four 8K regions.

North Star RAM features like bank-switching and parity checking are standard. The parity checking capability means that the RAM-32 is constantly diagnosing itself. That's a plus for your system. The fact that parity checking is a North Star RAM-32 standard is a plus for your pocketbook! There is no extra charge for this important capability.

A Horizon with 48K of RAM can be configured by using one North Star 16K RAM board and a RAM-32. Need more memory? 56K can be configured by using two RAM-32 boards with one 8K region switched off.

## NORTH STAR MDS, ZPB, FPB FOR OTHER S-100 COMPUTERS

Upgrade your system with these North Star products — available for any S-100 computer: Micro Disk System — a complete 5¼" floppy disk system, Z80 Processor Board, or the Hardware Floating Point Board.

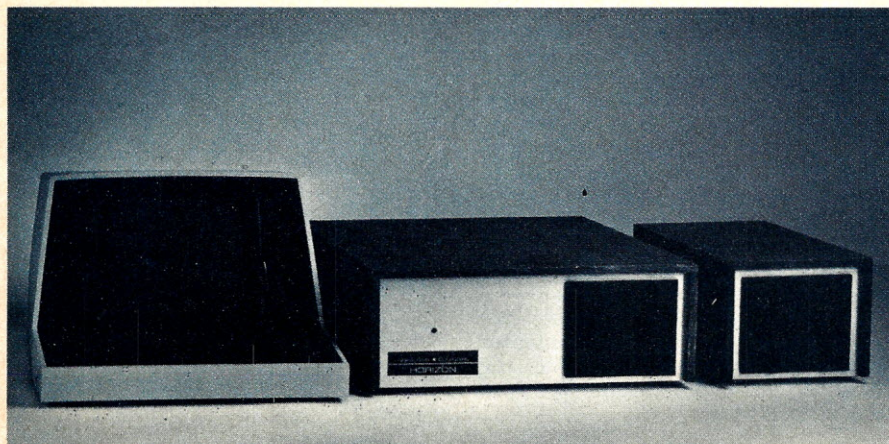
### Horizon and RAM board prices are:

	Kit	Assembled
Horizon - 1-16K	\$1599	\$1899
Horizon - 1-32K	1849	2099
Horizon - 2-32K	2249	2549
RAM-32	599	659
RAM-16	399	459

◀ A typical Horizon configuration: CRT, Horizon computer, Additional Drive Cabinet (ADC).

**NorthStar**  
Computers

2547 Ninth Street  
Berkeley, California 94710  
(415) 549-0858



CIRCLE 182 ON READER SERVICE CARD



# Notices

## Teachers Wanted

The Washington office of the Department of Defense needs help in locating teachers for computer science and electronics.

The DoD Dependents Schools, serving the children of US military and civilian support personnel throughout much of the world, are in need of computer science teachers and electronic training instructors. Thirty-eight computer systems are available to the instructional program, with BASIC being the most commonly used language.

Qualification requirements: A minimum of nine semester hours in computer science plus sufficient additional course work to qualify as a teacher in another subject.

For full information, call Mr. Francisco or Ms. Wycoff at (202) 325-0690 or write for an employment application (Department of Defense, Office of Dependents Schools, 2461 Eisenhower Ave., Alexandria, VA 22331).

## Association For Computers And The Humanities

An Association for Computers and the Humanities was established by thirty-five charter members who attended the inaugural meeting in New York last December. The first responsibilities of the new association will be to coordinate existing operations, like the International Conference on Computers and the Humanities and the journal *Computers and the Humanities*.

Elected at the first meeting were Joseph Raben (*Queens College/CUNY*) as president pro tem, Antonio Zampolli (*University of Pisa*) as vice-president pro tem, and Donald Ross, Jr. (*University of Minnesota*) as executive secretary. An executive council of twelve members was also elected.

Information regarding the Association and the next International Conference on Computers and the Humanities may be obtained from Joseph Raben, Queens College/CUNY, Flushing, NY 11367. (212) 520-7407.

## Computer Camp

This summer youngsters can sign up for a day camp in Orange where the main activity won't be swinging a baseball bat or splashing in a pool, but rather experiencing...computers. This unique recreational and educational experience is directed by Dr. Michael Zabinski, Professor at Fairfield University. It is believed to be the only computer summer day camp currently offered in the USA.

After a most successful 1978 Com-

puter Camp, again this year two action packed, 2-week sessions are planned: June 29 - July 13 and July 16 - July 27. The 20 campers per session, ages 10-17, will enjoy 8 computers for ample "hands-on", and 3 instructors for small group instruction. Dr. Zabinski will be assisted by 2 area high school teachers. The camp is for students of all levels of computer experience including no experience whatsoever.

For further information contact Michael Zabinski, Ph.D., camp director at 795-9069 or write 382 Hitching Post Drive, Orange, Connecticut 06477.

## Personal Computing Festival

The June 4-7 Personal Computing Festival program will consider applications of microcomputers to art, education, fun, and profit. The festival also will feature demonstrations of personal computer innovations and commercial exhibits. It will be held in New York City at the Sheraton Center Hotel, 52nd Street between 7th Avenue and Avenue of the Americas. There will be **Creative Computing** booths in the Main Exhibit area and in the Personal Computing Exhibit area. Come visit us! Both Dave Ahl and Ann Corrigan of **Creative Computing** will be giving presentations during the festival. For additional information about the festival contact AFIPS, 210 Summit Avenue, Montvale, N.J. 07645, 201/391-9810.

## Learning, Evaluation, and the New Technologies

This five-day institute offers college teachers and administrators training and practical experience with new tools and approaches. A series of seminars throughout the week covers key topics in planning and evaluating learning and teaching. A common base of practical experience is established by workshops on, for example, local production of video recordings for instruction, evaluation of innovative materials in a learning center, and incorporation of personal computers in teaching and scholarly work. Hands-on experience will be provided with critique and discussion sessions following.

For information please contact The Summer Institute Coordinator, Center for Research on Learning and Teaching, 109 E. Madison Street, Ann Arbor, Michigan 48109, (313) 763-0158.

## Articles Solicited For Annals Of The History Of Computing

The Editors and Editorial Board of the *Annals of the History of Computing* are currently soliciting articles for this new quarterly periodical. The *Annals* will be published beginning in July 1979 by the American Federation of Information Processing Societies, Inc. (AFIPS). The publication will focus on the history of computing by including contributions from individuals who participated in, or witnessed, the events and decisions which have shaped the present computing environment.

In addition to formal articles, individuals are invited to submit short anecdotes or personal recollections, commentaries on collections of private letters considered historically relevant, descriptions of current historical projects, articles on the influence of societal factors on the development of computing, reports of significant successes and failures in the computing field, and annotated bibliographies of relevant publications. Coverage will center on events and developments that occurred at least 15 years prior to the date of publication.

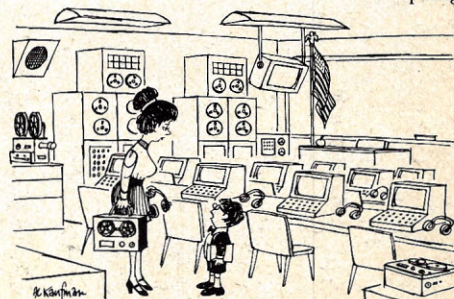
Prospective authors interested in submitting articles should send five copies of their contributions to Bernard A. Galler, Editor-in-Chief, *Annals of the History of Computing*, University of Michigan, College of Literature, Science and the Arts, 2522 LSA Building, Ann Arbor, MI 48109.

## February Fix-ups

In our February issue, we forgot to say that the Lincoln head cover graphic was submitted by John L. Joseph of Honeywell Information Systems. Sorry.

Don Smith, author of "Computerized Sports Predictions," Feb. 1979, page 122 has developed a guide for implementing this program on several different microcomputers. To obtain a copy, send a self-addressed, stamped envelope to Don Smith, 6519 Plaza Pkwy., #123, Ft. Worth, TX 76116.

©Creative Computing

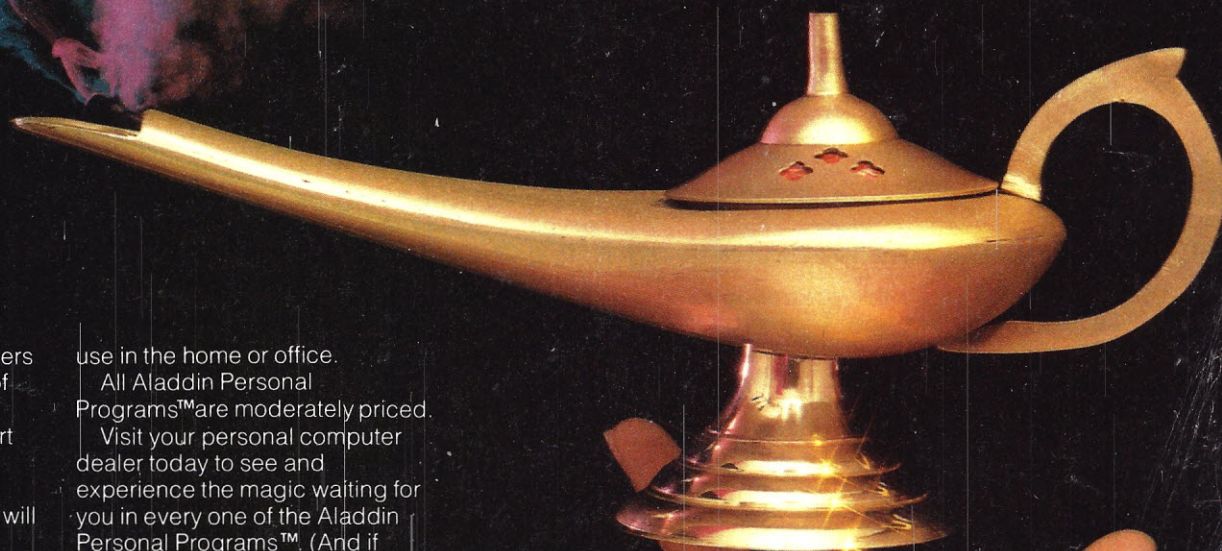


"Whatever happened to 'amber waves of grain?'"



# Now You Can Make Your Own Magic

Unleash the Full Power  
of Your  
Personal Computer  
With the  
All-New Aladdin  
Personal  
Programs™



Aladdin Automation now offers  
the magic of a full range of  
Personal Program™ series  
specially designed to support  
most popular personal  
computers available today.  
Some Personal Programs™ will  
take you to faraway places of  
adventure, action-packed  
adventures. Others will bring  
filled learning experiences  
home to you and your child. Still  
others are designed for your own

use in the home or office.

All Aladdin Personal  
Programs™ are moderately priced.

Visit your personal computer  
dealer today to see and  
experience the magic waiting for  
you in every one of the Aladdin  
Personal Programs™. (And if  
your dealer hasn't ordered his  
supply yet, then ask him to write  
Aladdin Automation for complete  
information on all the Personal  
Programs™ available now.)

**Welcome To The All-New  
World Of Aladdin. And Get Ready  
to Make Your Own Magic**

CIRCLE 200 ON READER SERVICE CARD



ALADDIN AUTOMATION, INC.  
ALADDIN COMPUTER CORP.

3420 Kenyon St. San Diego, Ca. 92110

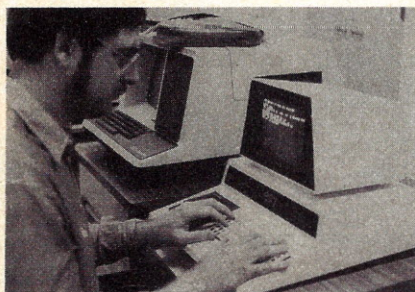


# Editorial

John Craig



## Spreading The Word

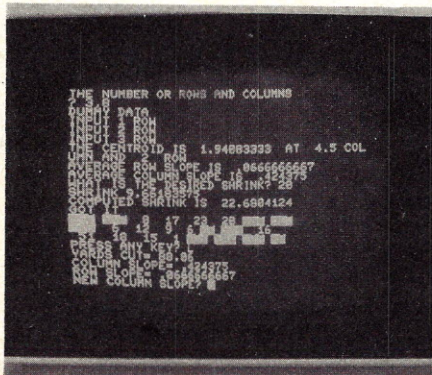


I recently saw a demonstration of an interesting program, running on a PET, at my local computer club. Steve Jordan, who makes his living as a land leveler (excavator), had written a survey program for land grading and filling. There wasn't really anything spectacular about Steve's program... it was a typical situation where a person with a certain background and talent applied that knowledge and wrote a program so the computer could help in his work. Many of us with personal systems have developed similar programs and afterwards done the same as Steve...kept it to ourselves. Let me throw out a suggestion that would make these little (and big) developments really "spectacular." (And, by the way, I haven't discussed this idea with Steve...but I will next time I see him.)

The chances are quite good that there's a publication devoted to the field of surveying and land filling. Imagine how many other people in his

profession Steve could get turned on to personal computers if he wrote an article describing his application. (He explained that this program saves him hours of tedious calculator computations almost daily and that the computer has more than paid for itself as a result.) There are literally thousands\* of trade and special interest publications in this country. We can get a lot of the readers of those magazines turned onto personal computing if we'll sit down and write about the specialized applications being developed. Your public library has several books which lists various publications (and the kind of articles they buy).

Keep in mind that I did say "specialized applications" (i.e., those which would be of interest to a limited number of people). Creative Computing wants those articles which appeal to the wider audience!



## Get Your Up-Grade Kit Here:

**AL:** Birmingham: Computer Center, (205) 942-8567; Huntsville: Computerland, (205) 539-1200. **AZ:** Tucson: Myotis Enterprises, (602) 326-5306. **CA:** Berkeley: Byte Shop, (415) 845-6366; Davis: Capitol Computer Systems, (916) 483-7298; El Cerrito: Computerland, (415) 233-5010; Hayward: Computerland, (415) 538-8080; La Mesa: EDP Management Inc., (714) 462-5400; Los Altos: Computerland, (415) 941-8154; Marina Del Rey: Base 2, (213) 822-4499; Mt. View: Byte Shop Computer Store, (415) 969-5464; Digital Deli, (415) 961-2670; Palo Alto: Byte Shop, (415) 327-8080; Sacramento: Capitol Computer Systems, (916) 483-7298; San Diego: Byte Shop of San Diego, (714) 565-8008; San Francisco: Byte Shop, (415) 434-2983; Computer Center Inc., (415) 387-2513; Computer Store of San Francisco, (415) 431-0640; Computerland, (415) 546-1592; San Jose: Electronic Systems, (408) 226-4064; San Rafael: Computer Demo Room Inc., (415) 457-9311; Santa Clara: Byte Shop Computer Store, (408) 249-4221; Walnut Creek: Computerland, (415) 935-6502. **CO:** Denver: Computerland of Denver, (303) 759-6685; Englewood: Byte Shop, (303) 761-6232. **CT:** Fairfield: Computerland of Fairfield, (203) 374-2227; New London: R & R Computer Store, (203) 447-1079. **FL:** Ft. Lauderdale: Computer Age, (305) 791-8080; Computerland, (305) 566-0776; Jacksonville: Williams Radio & TV, (904) 354-5460; Panama City: Boyd Ebert Corp., (904) 769-4492; Tampa: Microcomputer Systems, (813) 879-4301. **GA:** Smyrna: Computerland of Atlanta, (404) 953-0406. **HI:** Honolulu: Computerland, (808) 521-8002. **IL:** Champaign: Byte Shop, (217) 352-2323; Niles: Computerland, (312) 967-1714; Oak Lawn: Computerland, (312) 422-8080; Peoria: Computerland, (309) 688-6252. **KY:** Louisville: Computerland, (502) 425-8380. **MA:** Cambridge: Computer Shop, (617) 661-6270; Waltham: Computer Mart Inc., (617) 899-4540. **MD:** Rockville: Computerland of Gaithersburg, (301) 948-7676. **MI:** Ann Arbor: Newmann Computer Exchange, (313) 994-3200; East Lansing: New Dimensions in Computing Inc., (517) 337-2880; Kentwood: Computerland of Grand Rapids, (616) 942-2931; Royal Oak: Computer Mart, (313) 576-0900. **MN:** Bloomington: Computerland of Bloomington, (612) 884-1474; Minneapolis: Computer Depot Inc., (612) 927-5601. **NB:** Omaha: America Computers, (402) 592-1518. **NC:** Raleigh: Byte Shop, (919) 833-0210. **NJ:** Budd Lake: Computer Lab of NJ, (201) 691-1984; Clark: S-100, (201) 382-1318; Iselin: Computer Mart of NJ, (201) 283-0600; Succasunna: Computer Hut, (201) 584-4977. **NY:** Carle Place: Computerland of Nassau, (516) 742-2262; Elmira Heights: Red Ten Electronics, (607) 734-3566; Ithaca: Computerland of Ithaca, (607) 277-4888; Johnson City: Micro World, (607) 798-9800; New York City: Computer Mart of NY, (212) 686-7923; Syracuse: Computer Shop of Syracuse Inc., (315) 446-1284; White Plains: Computer Corner, (914) 949-3282. **OH:** Cincinnati: Digital Design, (513) 561-6733; Columbus: Mini Micro Computer World Inc., (614) 235-5813; Ohio Microcomputer Specialists, (614) 488-1849; Dayton: Computer Solutions, (513) 223-2348. **OK:** Oklahoma City: Microlithics Inc., (405) 947-5646; Micronics, (405) 942-8152. **PA:** Frazier: Personal Computing Corp., (215) 647-8463; Philadelphia: Microtronix, (215) 665-1112; State College: Micro Computer Products Inc., (814) 238-7711. **TX:** Austin: Computerland, (512) 452-5701; Dallas: KA Electronic Sales, (214) 634-7870; Ft. Worth: Patrick Associates, (817) 531-2761; Garland: Digital Research Corp., (214) 271-2461; Houston: Computerland of SW Houston, (713) 977-0909; Houston Computer Mart, (713) 649-4188; San Antonio: Micromart, (512) 222-1426. **UT:** Orem: Johnson Computer Electronics, (801) 224-5361. **VA:** Alexandria: The Computer Hardware Store Inc., (703) 548-8085; Computers Plus, (703) 751-5656; Arlington: Arlington Electronics Wholesalers, (703) 524-2412. **WA:** Bellevue: Computerland of Bellevue, (206) 746-2070; Seattle: Magnolia Microsystems, (206) 285-7266. **WI:** Madison: Computerland of Madison, (608) 273-2020; Neenah: Fox Valley Computer Store, (414) 725-3020. **CANADA:** **ONTARIO:** Mississauga: Arisia Microsystems, (416) 274-6033; Toronto: Computer Mart Ltd., (416) 484-9708. **BRITISH ISLES:** **CHESHIRE:** Cheadle: New Bear Computing Store, 061-491-0134. **ESSEX:** Ilford: Byte Shop Ltd., 01-554-2177. **HARTFORDSHIRE:** New Barnet: Computer Components, 14 Station Rd. **ISRAEL:** Haifa: Microcomputer Eng. Ltd., 31-070. **WEST GERMANY:** Munich: ABC Computer Shop, Schellingstrasse 33, 8000 München 40; Microcomputer Shop, Toelzerstr. 8, D-815 Holzkirchen; Wedel: Digitronic Computer Systems, Bei der Doppeliche 3-5.

## Ithaca Audio

CIRCLE 109 ON READER SERVICE CARD



# The Simple Up-Grade™

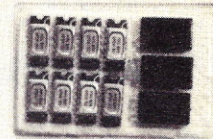
Trying to add computer memory is not much fun if you don't get everything you need.

step directions and diagrams. And if a personality jumper is required, it's *premade*.

The TRS-80\* memory expansion was our first Simple Up-Grade. Now there are two more—for owners of Apple II† and Exidy Sorcerer‡ computers. Each kit is 100% guaranteed—if a part ever fails, we replace it FREE. Your Ithaca Audio dealer has them in stock, only \$140. Now you can afford to add high quality, high density memory to your system for remarkably little—far less than you would expect to pay from Radio Shack, Apple, or Exidy directly.

## The Simple 16K APPLE II\* UP-GRADE™ KIT

Everything you need to up-grade your Apple II in blocks of 16K.



- 8 tested and guaranteed 16K RAMs.
- New Memory Select Units.
- Use only a household screwdriver.
- Easy instructions.

ITHACA  
AUDIO

P.O. Box 91 Ithaca, New York 14850

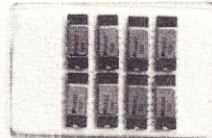
These Simple Up-Grades are Ithaca Audio's first step in adding more capability and reliability to your computer at lower cost. Other Up-Grades are on the way to your dealer now.

Receiving unprogrammed jumpers and having to program them yourself is not much better. Most important, that's the place where the problems are introduced.

So Ithaca Audio's better idea is the Simple Up-Grade. Each Simple Up-Grade is specially designed to make adding memory foolproof. We include all the parts you'll need; 8 prime, tested 16K RAMs, along with concise step by

## The Simple 16K SORCERER\* UP-GRADE™ KIT

Everything you need to up-grade your Sorcerer in blocks of 16K.



- 8 tested and guaranteed 16K RAMs.
- New programming jumpers.
- Use only a screwdriver and soldering iron.
- Easy instructions.

ITHACA  
AUDIO

P.O. Box 91 Ithaca, New York 14850

# ITHACA AUDIO

P.O. Box 91  
Ithaca, New York 14850  
Phone: 607/257-0190

\*TRS-80 is a registered trademark of Tandy Corp.

†Apple II is a registered trademark of Apple Computer, Inc.

‡Sorcerer is a registered trademark of Exidy, Inc.

CIRCLE 109 ON READER SERVICE CARD





# Input Output

## Networks, Anyone?

Dear Editor:

Is anyone thinking about setting up a nationwide network of people with microcomputers and communications facilities? I have an Apple II with the communications card.

Bob Munson  
120 Howard Avenue  
Middlesex, N.J. 08846

*Several organizations have established local networks around the country...which are primarily "bulletin boards." You call up the number and then transmit a message which will be retrieved later by the addressee [who also has access to the system]. I'm not sure just what the hardware requirements are for the various systems but I'll find out by the July issue...which will be devoted to this topic. Here are some of the systems you might try dialing into [try typing several carriage returns to adjust the baud rate of your terminal to the host computer]:*

San Diego	714-565-0761
Santa Clara	408-246-2805
Washington D.C.	703-281-2125
Boston	617-963-8310
Chicago	312-528-7141
Atlanta	404-458-4886

— JC

## Word Search Program

Dear Editor,

You did a great job presenting my Word Search program in the Nov-Dec '78 issue. Thanx!

A sorta-bug: Although the prog is *correct*, some people may ignore the lower case in line 520, and type it in upper case. This holds *especially* for people with upper-case *only* terminals. The fix is to simply drop the second statement on the line so it now reads:

520 TES=MIDS(T\$,J,1)

Leor Zolman  
1010 Mass Ave, #61  
Cambridge, MA 02138

## Heath Owners, Unite!

Dear Editor:

I have been a subscriber to your magazine for about one year now, and there is something happening that I find very puzzling.

Over a year ago, I completed my Heathkit H8 computer system. I chose Heath because I had virtually no knowledge of computers; and, on the other hand, I had built many other Heathkits.

What puzzles me is that I see neither Heath software or hardware articles nor advertisements for same in your magazine or the others which I read. At the same time, there have been recently many for the Radio Shack and PET systems, etc., which to my knowledge came on the market after the Heath.

This letter was prompted by your request for programs on page 4, of the January '79 issue for machines not including Heath. Some of these machines I would have assumed to be less popular than Heath.

Incidentally, this is in no way a loaded question in that I really have no idea what the answer/problem is.

Thank you for your help.

Leonard Root, Jr.  
15473 Patricia Dale Dr.  
Baton Rouge, LA 70815

*The reason you haven't seen many ads for Heath software and hardware is because Heath wanted it that way. That statement is not to be interpreted as derogatory... it's just fact. Heath was one of the first personal systems manufacturers to depart from the S-100 bus. The reason was that they would prefer to have you buy parts for your system from them. Aside from Godbout Electronics [in Oakland CA] offering H8 memory boards and Info 2000 [Carson CA] with their H8 floppy disk system, I haven't heard of many other manufacturers getting into the Heath market. Plus, Heath developed their own BASIC, rather than going with Microsoft or Northstar BASIC, and they have their own operating system. Your best bet would be to check into the software being offered by the Heath User's Group [HUG], Hilltop Rd., St. Joseph, MI 49085. The HUG Manager and Editor is Jim Blake [he's one of the "white hat good guys"]. And as far as articles are concerned...the first step is for you Heath owners to write 'em! — JC*



## “Systems Extensions for TRS-80” —a book just for you

- # Only \$3.00

**LIBRARY 100**  
—still available  
at U.S. \$49.50  
+ \$2.00 postage  
and handling



**The Bottom Shelf, Inc.**  
**P.O. Box 49104**  
**Atlanta, Georgia 30359**



CIRCLE 149 ON READER SERVICE CARD



## Taking The Selectric Route

Dear Editor:

I read Don Skiff's tale of woe (Who Really Needs Interfacing Problems - Creative Computing - Feb. 79) with some sadness because I know that there are many other would-be personal computerists who faced similar problems and just gave up. At least Don is still in there kicking.

Like Don, I am a free-lance writer and I've had to face the word processing hurdle in my rush to become rich and famous. I've appeared in Creative Computing and that makes me famous, right?

I believe that the lowest cost and, surprisingly, one of the best word processing systems consists of an S-100 bus computer, the Discus disk system, CP/M Electric Pencil II and a good used Selectric based I/O Terminal. The printer seems to be the part that causes the most problems. I've seen all kinds of schemes to interface the bare Selectric, modified Selectric, and even the basic typewriter Selectric to various microprocessors. Why bother? Heavy duty Selectrics with RS-232 interfaces are readily available from \$200 to \$700 depending on condition and they are plug-in compatible with any serial port. A simple ASCII to EBCDIC or Correspondence Code software package completes the picture. I had such a setup running on my SOL for more than a year with great results.

Rod Hallen  
P.O. Box 73  
Tombstone, AZ 85638

## More On Subscript Conversion

Dear Editor:

James Garon's subscript conversion technique (Sep/Oct '78) for computers with no two-dimensional array capability is effective, particularly for temporary list storage or an easily generated mathematical array (Pascal's triangle, etc.) since it is a one step operation. But an alternative for permanent arrays (such as Wumpus caves) is to use indices. From my own Wumpus program, my indices are:

A(1)=21  
A(2)=24  
A(3)=27  
-----  
A(19)=75  
A(20)=78

These indices are used in this manner:

90 N=3  
100 X=A(N):R=A(X):S=A(X+1):T=A(X+2)

where N= number of the cave the player is in and R, S, and T are the adjoining caves:

N=3  
A(3)=27  
A(27)=19  
A(28)=11  
A(29)=12  
R=19  
S=11  
T=12

This technique can also be used effectively for irregular lists if the data is to be READ into it. I have found indexing makes it easier to keep track of arrays containing related data which is changing (game plays, etc.) since visualization is easier. This can be important when one is troubleshooting programs with a lot of branching.

Charlie Green  
1424 N. Custer St.  
Colorado Springs, CO 80903

## Superprimes!

Dear Editor:

Please find enclosed a complete list of Superprimes (Puzzles & Problems, Jan. 1979). We were quite surprised when we found there were no eleven digit Superprimes, consequently, no Superprimes with more than ten digits. When this finite list (147 Superprimes) was generated, we truly expected to find many more. This little exercise prompted us to investigate a few other types of primes. We thought your readers might like to try a few.

A Duper-Prime is a prime and is generated the same as a Super-prime, except digits are eliminated from the left. A Super-Duper-Prime is the same except the digits can be eliminated from the left or the right in any order. Finally, the ultimate prime. It is prime that yields a prime when selecting any of the digits in any order (not repeating the use of them) and still having a prime.

137 is a good example of all of these with the exception of ultimacy. There are only three ultimate primes with more than two digits.

Ken Guralnik  
Karl Outram  
P.O. Box 1912  
Las Vegas, NV 89101

1979339339.	739391.	29399.	3119.	293.
1979339333.	719333.	23993.	2939.	239.
197933933.	593993.	23399.	2399.	233.
73939133.	593933.	23339.	2393.	199.
59393339.	373393.	23333.	2339.	197.
37337999.	373379.	19997.	2333.	193.
29399999.	293999.	19993.	1999.	191.
23399339.	239933.	19991.	1997.	179.
19992219.	233993.	19979.	1993.	173.
19793393.	199933.	19973.	1979.	139.
13999133.	199931.	19937.	1973.	137.
7393933.	199799.	19793.	1933.	131.
7393931.	199739.	19739.	1931.	113.
7393913.	199379.	19333.	1913.	79.
5939333.	199373.	19319.	1733.	73.
3733799.	197933.	19139.	1399.	71.
2939999.	193337.	17333.	1373.	59.
2399333.	139999.	13999.	1319.	53.
2339933.	139991.	13997.	797.	37.
1999339.	73939.	7393.	739.	31.
1999331.	73331.	7333.	733.	29.
1997999.	71933.	7331.	719.	23.
1979339.	59399.	7193.	599.	19.
1399999.	59393.	5939.	593.	17.
1399919.	37397.	3797.	379.	13.
1399913.	37339.	3793.	373.	11.
739399.	37337.	3739.	317.	7.
739397.	31379.	3733.	313.	5.
739393.	31193.	3137.	311.	3.
				2.
				1.

## Why "Pascal?"

Dear Editor:

I just finished reading your article, "Pascal becomes software superstar," (Feb. 1979 issue) and noticed that it states that the reason for the name "Pascal" is "for no reason other than the high esteem in which Professor Wirth holds his teachings."

Readers may be interested in knowing more about the origin of the name. Professor Wirth replied in the December 21, 1979 issue of Electronics to the original printing of this article that, "...I am neither capable of fully understanding his philosophy nor of appreciating his religious exaltations. Pascal, however, was (perhaps one of) the first to invent and construct a device that we now classify as a digital computer. He did so at the early age of 16, when he was called upon by his father, who was a tax collector, to assist in the numerous and tedious calculations."

Robert Gaebler  
University of Missouri  
Rolla, MO 65401





# Introducing the personal computer you've waited for. The Exidy Sorcerer.

I didn't buy my personal computer until I found the one that had all the features I was looking for.

The Exidy Sorcerer does everything I wanted to do and a few things I never dreamed of.

It isn't magic. Exidy started with the best features of other computers, added some tricks of their own, and put it all together with more flexibility than ever before available. Presto! My reasons for waiting just disappeared.

**I wanted pre-packaged programs.** Software on inexpensive cassette tapes for the Sorcerer is available from Exidy and many other software makers.

**I wanted user programmability.** The Sorcerer's unique plug-in ROM PAC™ Cartridges contain programming languages such as Standard (Altair 8k\*) BASIC, Assembler and Editor (so I can develop system software), operating systems such as DOS (so I can also use FORTRAN and COBOL) and applications packages such as Word Processor.

**I wanted easy to use graphics.** Programming pictures is as easy as typing messages on the screen, and the 256 character set includes 128 user-definable graphic or foreign language symbols.

**I wanted the best video.** With 122,880 points in a 512 x 240 format, I get the most detailed illustrations.

**I wanted to display more information.** The Sorcerer displays 1920 characters in 30 lines of 64 characters — equal to a double-spaced typed page.

**I wanted a full, professional keyboard.** The Sorcerer's 79-key data processing keyboard provides designated graphics, the complete ASCII character set in upper and lower case, and a 16-key numeric pad for calculations.

**I wanted memory.** The 12k of ROM holds a Power-On Monitor and Standard BASIC; the user memory is internally expandable to 32k.

**I wanted expandability.** Communications, printer and tape storage

interfaces are built-in, and the optional 6-slot S-100 Expansion Unit captures all the hobby computer creativity and prevents obsolescence.

**I wanted a computer that's easy enough for children to use.** I just connect my Sorcerer to a video display and a cassette tape recorder, and if I have any questions the easy-to-understand Operation and BASIC Programming manuals have the answers.

**I wanted to buy from an experienced manufacturer.** In five years Exidy has become the third largest producer of microprocessor-based video arcade games.

**I wanted an affordable price.** This is where Exidy does a little magic. \$895 for 8k, \$1150 for 16k and \$1395 for 32k!

Now, what are **you** waiting for?

Call Exidy for the name of your nearest dealer. (408) 736-2110. Or write Exidy, 969 W. Maude Ave., Sunnyvale, CA, 94086.

**Exidy**  
inc.

\* Altair is a trademark for Pertec Computer Corp.



## Can You Follow Directions?

**Time Limit: Three Minutes**

**Instructions:**

This is a short test to see if you can follow directions. The questions are not difficult, but they are quite detailed. Good Luck!!

1. Read everything carefully before you do anything.
2. Put your name at the top of this page.
3. Circle the word 'name' in the second sentence.
4. Draw five (5) small squares in the upper left hand corner of the paper.
5. Beside the small squares, print 'yes, yes, yes'.
6. Put an 'x' in each square.
7. Put a circle around each square.
8. Draw a circle completely around sentence number seven (7).
9. Put an 'x' in the lower left hand corner of this page.
10. Draw a circle around the 'x' you just put down.
11. Draw a rectangle around the **word** five in sentence four.
12. *Loudly* call out your first name when you get this far.
13. If you think you have followed directions carefully to this point, call out 'I have it'.
14. On the reverse side of this paper, add 8950 and 9805.
15. Put a square around your answer, then a circle around the square.
16. In your normal speaking voice, count **backwards** from one to ten.
17. Underline all **even** numbers on the left side of the paper.
18. Put a square around each numeral (not word) that you wrote down.
19. Call out, in your normal voice, 'I am nearly finished, I have followed directions'.
20. Now that you have finished reading everything carefully, do only points one and three.

The originator of this little gem is unknown. It was adapted by P. Johnston for publication in the COMPUTING SERVICES BULLETIN of the University of Alberta, Edmonton from which, with permission, it is reprinted here.

## Crossnumber Puzzle

You shouldn't have too much trouble finding numbers which, when inserted in the blank spaces, complete all the equations. However, the big question is: how many solutions are there? Can you find them? Can you write a program on your computer to find them? (It's only eight trivial simultaneous equations but...)

DHA

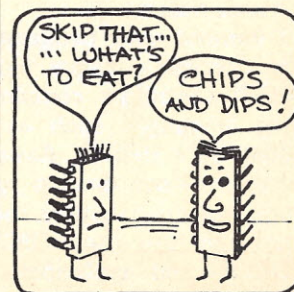
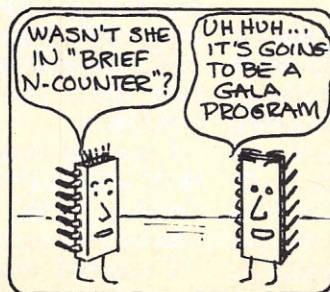
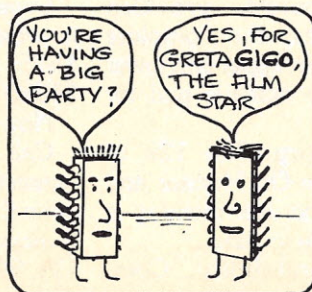
36	÷	12	+	11	=	14
—		+		—		+
a	—	b	×	c	=	d
÷		÷		—		÷
e	+	f	—	g	=	h
=		=		=		=
7	×	i	÷	j	=	14

## Follow Up on Crossnumber Puzzle

I was intrigued by your Crossnumber puzzle (Creative Computing, May-June 1978, Vol. 4, No. 3, p. 66). The unknowns can be denoted by the a-j as shown in the accompanying diagram. We have now 7 equations in 10 unknowns and seek non-negative solutions. With some juggling we can deduce that  $d=0$ ,  $1 \leq c \leq 4$ ,  $0 \leq g \leq 3$ ,  $7 \leq j \leq 10$  and that f is a positive multiple of 2g. If any values satisfying these constraints is chosen, the diagram can be completed. Hence, there are 10 basic sets of values for c,g,j and, for each of these, an infinite number of values of f.

Incidentally, the juggling would be a preliminary to the writing of any reasonable program and such a program could not, of course, show that there are infinitely many solutions.

Prof. K.A.Redish  
Associate Professor  
McMaster University  
Hamilton, Ontario



© L. WILDE 1977





# Expand Your Business Four Times This Year

Expanding a business four times in one year may be easier said than done except for your data processing needs. The new MSI Multi-User Computer System is designed to grow with your business by giving you the capability to add up to four user terminals which can be operated simultaneously.

At the heart of the system is the powerful MSI 6800 computer combined with MSI Multi-User BASIC and the new SDOS operating system.

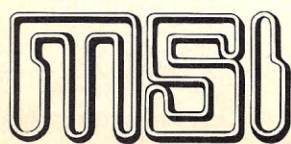
Utilizing the new MSI 16K Static RAM modules expands processor memory to 152K of RAM. Each of the four users commands 32K of processor RAM as well as simultaneous access to the data base.

MSI Multi-User BASIC can be used with any MSI disk memory system including the HD-8/R 10 megabyte and HD-76/R 76 megabyte fixed/removable hard disk systems.

Our new Multi-User Computer System also features a software controllable printer option which allows you to use both a "daisy wheel" word processor for high quality document preparation, and a dot matrix printer for high speed production.

MSI currently offers nine different computer systems for business, industrial, scientific, educational and personal applications. And software to make your data processing more effective includes a Business Accounting Package with accounts receivable, accounts payable, general ledger, and inventory control.

If your business is expanding and you would like to know how an MSI computer system can help you make it more profitable, call or write Midwest Scientific Instruments, 220 W. Cedar, Olathe, Kansas 66061, (913) 764-3273, TWX 910 749 6403 (MSI OLAT), TELEX 42525 (MSI A OLAT)



**Small Computers For Big Jobs**

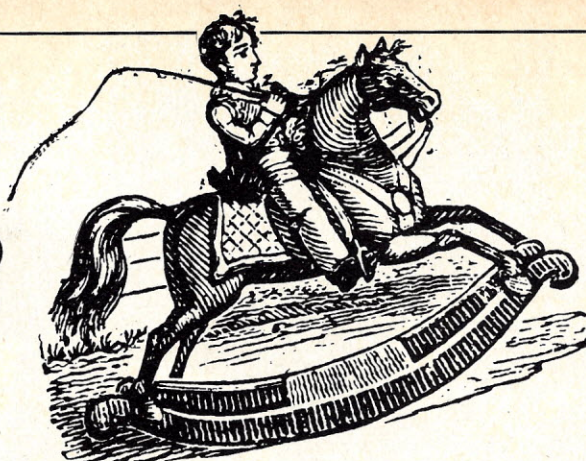
**Midwest Scientific Instruments**

CIRCLE 133 ON READER SERVICE CARD



# Random Ramblings

With David Ahl



## Electronics Star at 1979 Toy Fair

The extremely enthusiastic reception of electronics by a broad range of consumers in 1978 has created dramatic new growth opportunities in 1979. Toy industry people predict sales of \$200 million in hand-held electronic games alone, up from \$125 million in 1978. Many items such as Simon were sellouts in 1978 and the industry is trying to make sure that doesn't happen again although some manufacturers expressed fears of being stuck with an obsolete inventory.

What about all the much-heralded innovation? Was it really there? To find out, we visited the toy fair in New York and took a close look at the things that will be on the shelves this Christmas. Baseball was the most popular hand-held game with no less than nine versions from which to choose. We counted a baker's dozen (13) items that we'd consider truly innovative. Here's a roundup of entries from manufacturers, both large and small. Prices, where given, are approximate retail.



### IDEAL TOY CORP.

**Electronic Detective** adds light and sound to the classic detective mystery appeals of suspense, deduction and danger. The game's com-

puter brain can create 130,000 different crimes. Each player (private detective) grills the computer to obtain clues about 20 different crime suspects. Using the clues, players deduce their way to the culprit. Find the criminal and you win. Pick the wrong suspect and you lose with the real villain doing you in with a surprise gunshot.

Ideal had a giant-size Electronic Detective display which we "played." After going through suspects like Rip Raff, Toots Roll, and Buster Baily and finding they all had iron-clad alibis, we finally deduced that Lucy Tumble was the culprit. A simulated police siren told us we were right as Lucy was hauled to the pokey.



**Maniac** matches players against an infallibly clever computer that tests their senses in four ways. Sounds Abound requires listening to a series of rapidly repeating notes and hitting the lever when the computer counts off that number of beeps. In Look Twice, players get a glimpse of a computer pattern and then have to hit the lever when the exact pattern is repeated. In Musical Maniac, the computer plays a melody. When it stops abruptly, players race to hit their levers. In Time's Up, a tune is played for 3 to 10 seconds. Players then must try to measure the exact tune length.

We liked Maniac because it played both sight and sound games and seemed fair to all the players. It also adjusts the playing difficulty to the players' abilities, a nice feature.



### SELCHOW & RIGTER

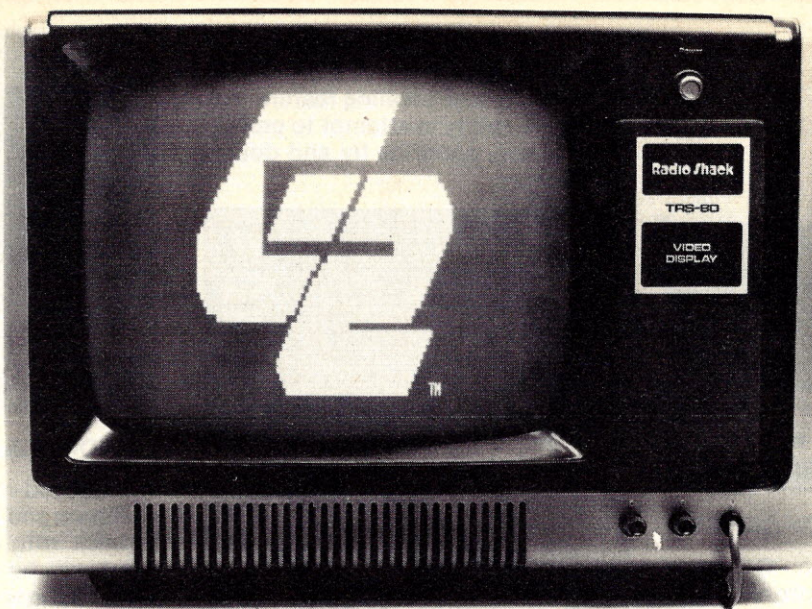
**Scrabble Brand Sensor Electronic Word Game** combines the challenge and excitement of Scrabble with computerized electronics. The object of Sensor is to guess your opponent's (or computer's) word in the fewest turns. To play with two, one player punches a word into the computer and the second player deduces the word, letter-by-letter as the computer screen flashes clues to the position and accuracy of the guessed letter. A "space-age" sound signals a correct deduction. When a player deduces a complete word, electronic jingles announce the triumph. For party play, groups of two or more can program words and alternate guessing the correct word.

We enjoyed playing Sensor in the "Press Play Pen" and found that it "knows" some rather interesting words that will keep you guessing!



CREATIVE COMPUTING





# INTRODUCING G2 LEVEL III BASIC.

**Now do more than ever before with the most powerful Basic you can buy for the TRS-80.**

Open the manual and load the cassette. Then get ready to work with the most powerful Basic interpreter you've ever had your hands on...Level III Basic for Radio Shack Computers. It loads right on top of the Level II ROM, and in just 5K of space, opens up your capability to new dimensions. For starters, this new cassette-based interpreter gives you the whole catalog of disk programming power. Plus graphics commands. Plus powerful editing commands. Plus long error messages, hex and octal constants and conversions, user defined functions and a number of commands never before available on either cassette or disk interpreters!

**Easier Loading, Fewer Keyboard Errors.** G2 Level III Basic eliminates aggravations you've had, including keyboard "bounce" and those super-sensitive tape deck settings. Programs will load easier, and you'll have far less trouble with input errors.

**Basic Access to RS-232.** Until now, if you wanted to access your RS-232 interface, you had to work in assembly language. G2 Level III Basic does the work for you, letting you use your interface with Basic statements.

**Have You Wished for More Power?** This new interpreter gives you 10 machine language user calls for subroutines, long error messages, a new **TIME\$** call for your real time accessory, plus measure or limit input timing that lets you put a time limit on responses when you're playing games or giving exams. And the list doesn't stop here.

**Easier and More Powerful Graphics.** This new Basic includes three simple commands that can eliminate dozens of program steps. **PUT** transfers information from a designated array to your screen; **GET** reverses the process. **LINE** makes your computer do the work when you input beginning and end points. Give it two diagonally opposite corner locations, and it'll outline the rectangle you're looking for.

**Only Microsoft Could Do It.** G2 Level III Basic was created by Microsoft, the same company that wrote Level II Basic for Radio Shack. And it actually uses Level II as a foundation for this enhanced add-on. By the time you've mastered all it can do, calling up the flexibility of the graphics commands, and even enjoying the convenience of renumbering, you'll wonder how it was all possible. It's like getting a whole new computer for your computer.

**Available Now for Only \$49.95.** You get the power that might otherwise cost you hundreds of dollars in additional equipment for only \$49.95. Price includes the User Manual, a Quick-Reference Card, and a preprogrammed cassette tape. Load the tape, open the manual, and get ready to work with the most powerful Basic Interpreter you've ever had your hands on. G2 Level III Basic for the TRS-80. Another member of the growing G2 Personal Computer Program Library.

For the name of the G2 dealer nearest you, call us toll-free at 800/538-8540 or 800/538-8541. In California, please call 800/672-8691.

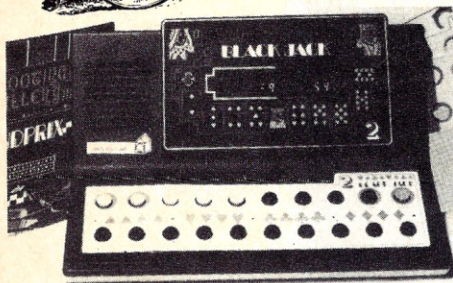
**THE REASON  
YOU BOUGHT  
YOUR COMPUTER.**



A Product of GRT Corporation  
Consumer Computer Group  
1286 North Lawrence Station Road, Sunnyvale, California 94086, 408/734-2910

CIRCLE 152 ON READER SERVICE CARD





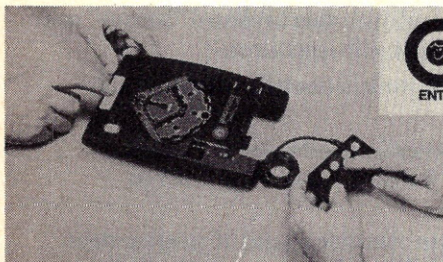
### WADDINGTON HOUSE OF GAMES

This leading British Company makes its debut in electronics with **The Game Machine**. It includes Shooting Gallery which presents various target patterns in the display — you have to guess them as quickly as possible. Code Hunter is yet another variation of Mastermind — find a 4-digit number between 1111 and 8888. Grand Prix is an action race game. Also old favorite Black Jack. The Game Machine doubles as a calculator when you're not playing with it.

### ENTEX INDUSTRIES

Here's the pitch—it's a change up—it's a curve-no, it's a knuckle ball. Strike one! Here comes a fast ball—it's a hit, it's going, going-caught by the center fielder. One out.

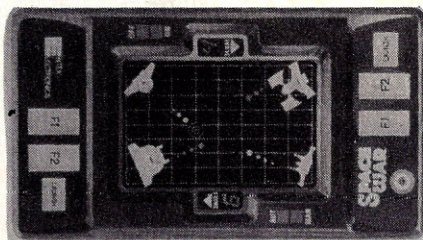
This exciting action is all yours in **Electronic Baseball**. Five different



itches. The batter can walk, strike out, or hit the ball. The "computer" decides if it's an out, single, double, triple, or home run. Special lights and sounds are different for each one. Keeps track of balls, strikes, outs, base runners, and score with a LED display...and you can play alone with the "computer" throwing random pitches to sharpen your "eye", or play against an opponent.

**Electronic Baseball 2** has remote control pitching and knuckle ball as well as continuous, cumulative digital scoring for both sides, with an

indicator to let you know what inning you're in. Scores up to 20 for each side. Also a base stealing feature with defensive ability to attempt to prevent stolen base, sacrifice fly and double play feature.



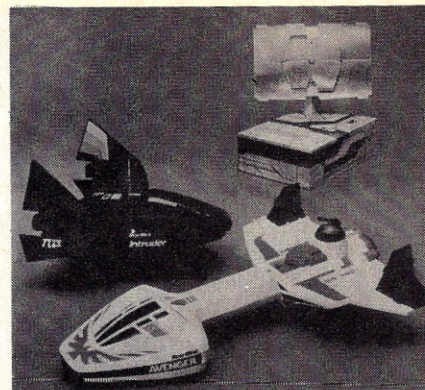
**Space War**. Launch fighters to attack enemy base ship. Each player tries to defend his position with battle cruisers, which fire laser torpedoes to destroy attacking fighters. First player to destroy opponent's base ship wins the game. LED indicators and electronic sound effects keep track of the action. Digital readout shows the number of enemy fighters destroyed.

Soccer, one of the first field-type electronic sports games rounds out the new entries from Entrex.



### CADACO

**Foto-Electronic Bowling** is claimed to be a genuine game of skill, but that skill probably isn't bowling. Makes spares and strikes (and gutter balls!) and performs all the functions of real bowling. Frame number, strike and spare (even the extra 10th frame ball or balls) and each player's score—all show on the LED display. You can control the speed and direction of the actual miniature bowling ball which is permanently sealed in the game to prevent loss. Flashing lights, different musical sounds for strikes, spares, gutter balls, and misses add to the fun.



### MILTON BRADLEY

Flushed with the runaway success of **Simon** and **Starbird**, Milton Bradley is back with some new entries they hope will be winners this year. **Star Bird Avenger** and **Star Bird Intruder** rise with a whine at lift-off; when they reach their chosen cruising altitude the sound levels off; at descent the sound of deceleration is heard. All control stems from the angle at which the child holds the spacecraft.

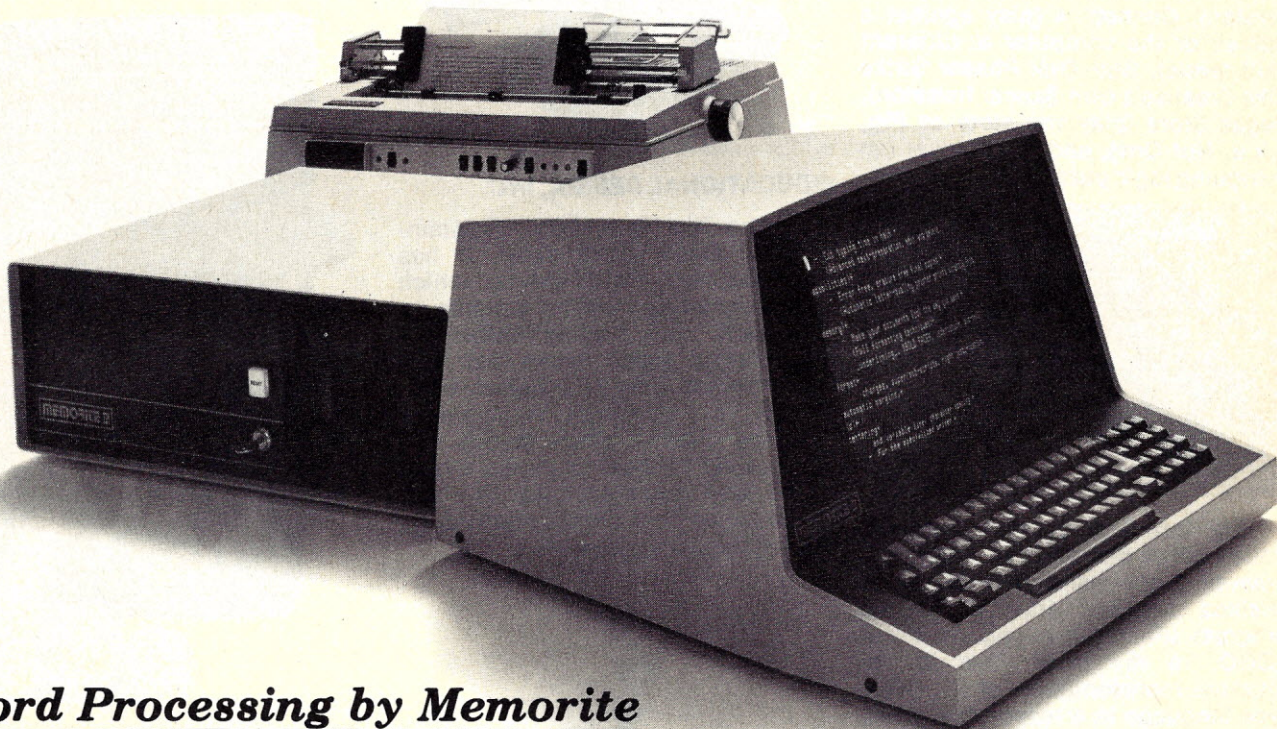
When their electronically controlled laser rays are fired and strike a reflective surface, their hit signals are activated, producing three loud whoops. They can also duel with each other, creating the sounds of galactic warfare, firing, scoring and temporarily disabling engines.



One of the most innovative new entries at the Toy Fair was **Microvision**, a hand-held mini-video game with its own built-in screen. Microvision comes with **Blockbuster**, really **Breakout** in your hand. After you crash through the third row of bricks, the ball speeds up and the game becomes a real challenge. Pat Mallette, M-B's genial head of Public



# Nobody does it better.



## Word Processing by Memorite

Owners are quick to praise Memorite 2 word processing system. And why not? Vector Graphic's Memorite 2 is one of the most modern, powerful and most cost effective word processors in the world.

Its value is just as much a function of its low cost as is its many useful features. Memorite 2 cuts typing time in half and automatically types from memory at a rate of up to 540 error-free words a minute.

Think of the possibilities: contracts, personalized form letters, manuals, catalogs, reports, mailing lists, proposals or other important documents.

See or call your dealer — he will be glad to answer all questions before and after he installs your system.

We think you'll be impressed. Best of all, years later you'll still be impressed.

— Dealer inquiries invited —

- ☐ Send me the name of the nearest dealer
- ☐ Send more information

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

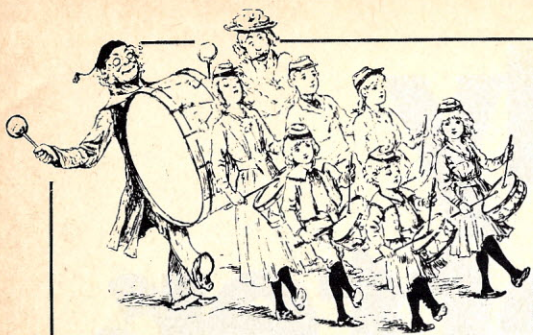
City/State/Zip \_\_\_\_\_

**VECTOR GRAPHIC INC.**

Vector Graphic Inc., 31364 Via Colinas  
Westlake Village, CA 91361, (213) 991-2302

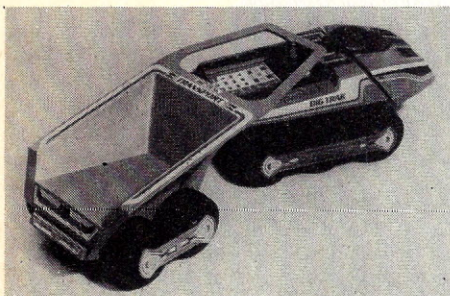
CIRCLE 203 ON READER SERVICE CARD





Relations, could hardly pry me away from Blockbuster once I got started with it — you'll find it addictive too.

Other plug-in ROM cartridges available for Microvision include Bowling (similar to the discontinued RCA video version), Pinball (a stylized version), Connect 4 (play against a human or the computer at different skill levels), Star Trek Phaser Strike (like Creative's own Saucer Invasion), Vegas Slots (play the slots or Pig, a.k.a. Not One), and Mindbuster (an intriguing logic puzzle).



**Big Trak** is a stylish tractor and trailer which responds to eight programming commands which can be chained together into a 16-step program. (For those of you who know LOGO, in my mind, this is the ultimate representation of a LOGO-type language in a responsive, neat, tough "toy.")

Forward! **Big Trak** advances for as many as 99 units, each unit being the measure of its own 13-inch length. Push the "Repeat" button, and it travels twice as far. It gives the same performance in reverse. It pivots either right or left in a full circle, or even beyond a full circle. It also pivots in tiny fractions of a circle, for **Big Trak** possesses 60 swiveling positions. It can make a turn, proceed in a straight line, turn again, and continue travelling on whatever course its young navigator has set. (Even oldish Publishers have been known to program **Big Trak**!)

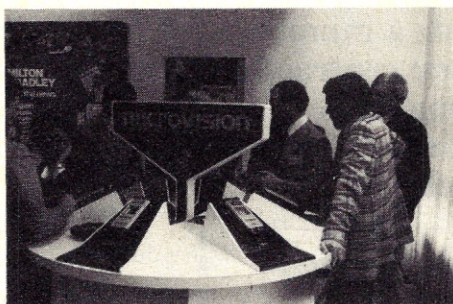
**Big Trak** has a total of 16 programming steps which direct its many functions. The child may send it around tables and chairs and other obstacles, and have it return to him — all without re-programming. All he needs to do is estimate the distances

and punch in his commands. **Big Trak** also fires a variety of sound-and-light weapons. The companion trailer or Transport attaches to **Big Trak** and hauls and dumps loads on pre-programmed commands. (Retail price: **Big Trak** \$43, Transport \$13).



#### EDUCATIONAL DESIGN, INC.

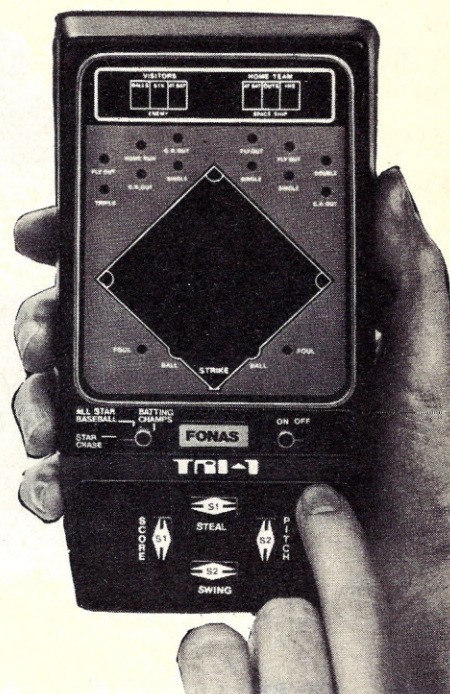
**Astro War** is a nifty "Programmable" space battle game. It has eight overlays ("battle charts") which you program by marking squares on the back. The playing surface is sensitive to pencil marks and thus your marked grid or program challenges your opponent to maneuver between pictorial space bodies and your secret "mines" or marks. We've never seen anything quite like this game based on a simple mark sense grid. Could be a winner!



Milton Bradley's Microvision is a hand-held electronic mini-video game with a self-contained liquid crystal screen. Seven game cartridges are available for it.

#### FONAS

**Tri-1** is a three-in-one game with baseball. Has computer-controlled fast, slow and curved pitches; runners moving around the bases with a base stealing feature. LED display keeps track of balls, strikes, outs, runs and inning. **Batting Champs** lets you practice hitting the computer's varied pitches. We liked **Star Chase** best, a combination skill and logic game which lets you try to outwit the computer and land on distant star systems before the computer. (Retail \$35).



#### PARKER BROTHERS

**Stop Thief** combines micro-chip technology with classic board game play. Two to four players track down a thief who has committed a crime at any one of 19 locations on the board. A 2,000-byte microprocessor-based Crime Scanner controls the thief's moves and gives clues to his whereabouts. Clues are audible — the electronically-generated sound of breaking glass, running footsteps, or a squeaking floorboard, for instance.





# THE TRS-80 ASSEMBLY LANGUAGE DEVELOPMENT SYSTEM.

(A STEAL AT TWICE THE PRICE)

A short time ago, Microsoft introduced TRS-80 FORTRAN— a complete ANSI-standard FORTRAN with macro assembler, linking loader, and text editor, all for only \$350. **The response has been overwhelming.**

Many TRS-80 users even told us, "The assembly language development software alone is worth that price." We think they're right, of course, but we've made it an even better deal.

## **ANNOUNCING: THE TRS-80 ASSEMBLY LANGUAGE DEVELOPMENT SYSTEM FOR \$175.**

For half the price of the TRS-80 FORTRAN Package, you can buy the TRS-80 ASSEMBLY LANGUAGE DEVELOPMENT SYSTEM, including:

**EDIT-80** A fast, random access text editor that's easy to use and loaded with features. Lets you insert, replace, print or delete lines;

edit individual lines; renumber lines in a file; and find or substitute text.

**MACRO-80** The best Z80 assembler anywhere. MACRO-80 supports a complete Intel-standard macro facility plus many other "big computer" assembler features: comment blocks, octal or hex listings, 8080 mode, titles and subtitles, variable input radix (base 2 to base 16), and a complete set of listing controls.

**LINK-80** Loads your relocatable assembly language modules for execution and automatically resolves external references between modules.

**CREF-80** Gives you a complete dictionary of program symbols, showing where each is defined and referenced.

The Microsoft TRS-80 FORTRAN Package is still available for \$350. Or, for **HALF PRICE**, get the TRS-80 ASSEMBLY LANGUAGE DEVELOPMENT SYSTEM.

Either way, it's a steal.

TO: Microsoft, 10800 N.E. 8th, Suite 819, Bellevue, WA 98004

☐ Send me the works! TRS-80 FORTRAN Package for \$350.

☐ Send me half the works! TRS-80 Assembly Language Development System for \$175.

☐ Check enclosed    ☐ Master Charge    ☐ VISA

CARD NUMBER

EXP. DATE

CARDHOLDER'S SIGNATURE

NAME

ADDRESS

CITY

STATE

ZIP



**Dealer Inquiries Invited**





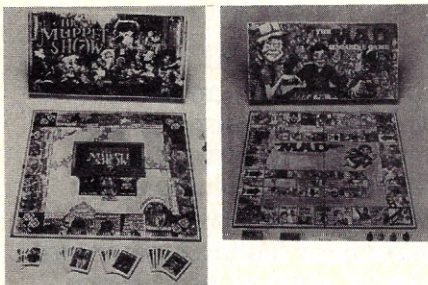
Simultaneously, the digital display records the building or street number where the crime is taking place. You try to build up a sequence of clues to determine the location to determine the location of the thief and, by rolling the dice and moving your detective, get next to the thief and arrest him. A false arrest gets an electronic raspberry sound and about 20% of the time the thief gets away after a shootout. There are sleuth cards and reward money which add to the excitement. The complex strategies introduced by the microprocessor insure that no two games are the same. (Retail \$33).



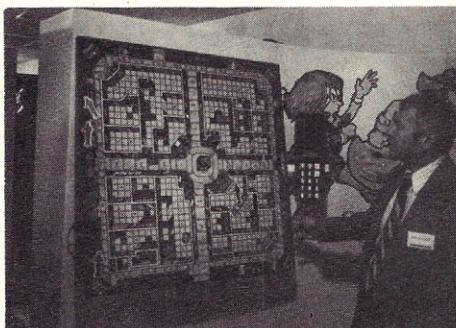
**Wildfire**, is a miniature pinball game which uses microprocessor-generated balls of light and authentic pinball sound effects. Each game consists of five balls; points are racked up on a digital scoring display which keeps track of up to four players. Features include: 3 levels of difficulty, lighted targets and bumpers, moveable electronic flippers and bonus point scoring. (Retail \$45).



Targeted at young science-fiction fans aged five to fourteen, **ROM** has three control buttons to manipulate the five functions which enable him to track and neutralize his intergalactic enemies. A built-in respirator allow him to breathe in any atmosphere and when he's ready to take off, his rocket pod emits an exciting blast-off roar. Three accessory tools give him superior powers to add to the fantasy fun.



Among the many new board game entries from Parker Brothers, we particularly liked **The Muppet Show Game** in which players audition for a spot on the show. Miss Piggy, Fozzie Bear and Sweetums are the preliminary judges, but in the end, all must face Sam the American Eagle — the official Muppet Show censor. (Retail \$3.00). **The MAD Magazine Game** is zany fun which pokes fun at traditional board games. It breaks all the rules as players move counter-clockwise on the board in an attempt to win the game by losing all their money. (Retail \$7.00)

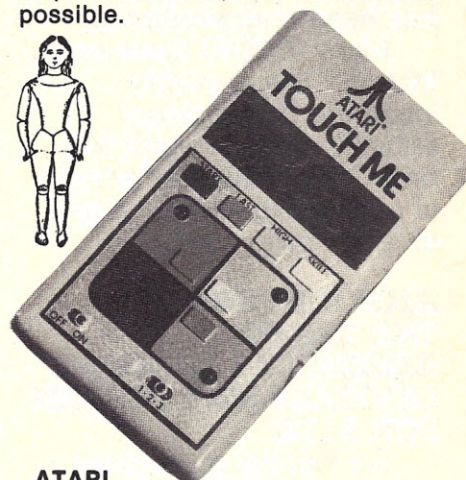


Parker Brothers spokesman demonstrates how to play electronic Stop Thief on a giant game board.



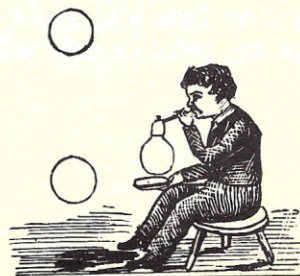
## LAKESIDE

**Computer Perfection** has four different games and 3 skill levels. The first two games are played directly against the computer, the second two are played by two opponents utilizing the computer. The object is to sequentially turn on and off lights, corresponding to shapes by pressing the buttons. The challenge is that button one may not light shape one, as you're playing, you've got to remember which button lights which shape in order to complete the sequence in order, in as few moves as possible.



## ATARI

Number 1 in the video game field, Atari has brought out its first handheld entry, **Touch Me**. Originated by Atari as a coin-op game in 1972, and popularized by Milton Bradley as a home game (Simon), pocket size Touch Me can be played by one or more players who have to remember a light/sound sequence.





# creative computing brings you its best

## Volume 1



\$8.95  
328 pp. softbound  
from Creative Computing Press

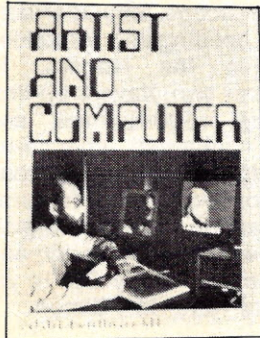
## The Best of Creative Computing

The first two years of *Creative Computing* magazine have been edited into two big blockbuster books. *American Vocational Journal* said of Volume 1, "This book is the 'Whole Earth Catalog' of computers." [6A] Volume 2 continues in the same tradition. "Non-technical in approach, its pages are filled with information, articles, games and activities. Fun layout."—*American Libraries*. [6B]

## Volume 2



\$8.95  
336 pp. softbound  
from Creative Computing Press



## Artist and Computer

by Ruth Leavitt

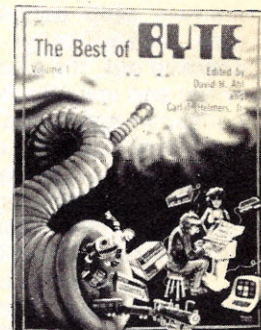
"Get yourself a copy of this book if you enjoy feeding your mind a diet of tantalizing high-impact information."

*San Francisco Review of Books.*

\$4.95  
121 pp. softbound  
from Creative Computing Press

This unique art book covers a multitude of computer uses and the very latest techniques in computer-generated art. In its pages, 35 artists explain how the computer can be programmed either to actualize the artist's concept (such as the visualization of fabric before it is woven) or to produce finished pieces. Over 160 examples, some in full color. [6D]

## The Best of BYTE



\$11.95  
386 pp. softbound  
from Creative Computing Press

This is a blockbuster of a book containing the majority of material from the first 12 issues of *Byte* magazine. The 146 pages devoted to hardware are crammed full of how-to articles on everything from TV displays to joysticks to cassette interfaces and computer kits. But hardware without software might as well be a boat anchor, so there are 125 pages of software and applications ranging from on-line debuggers to games to a complete small business accounting system. A section on theory examines the how and why behind the circuits and programs, and "opinion" looks at where this explosive new hobby is heading. [6F]

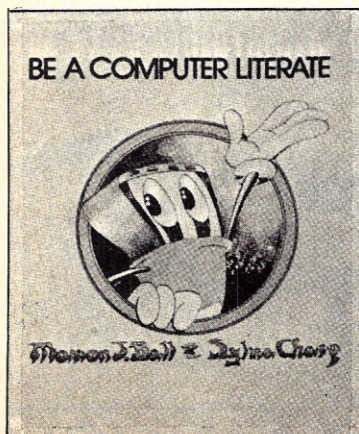
## Be A Computer Literate

by Marion J. Ball and Sylvia Chapp

This is the most basic, introductory book on computers ever put together for instructional use. Its full-color diagrams, drawings, photos and large, explicit type make this book a pleasure to read. This chapter titles, themselves, best illustrate its contents— [6H]

- I Introduction
- II What Are Computers
- III Kinds of Computers
- IV What Goes On Inside Computers
- V Communicating With The Computer
- VI Language Of The Computer
- VII How To Write A Simple Program
- VIII How Computers Work For Us
- Glossary

\$3.95  
61 pp. softbound  
from Creative Computing Press

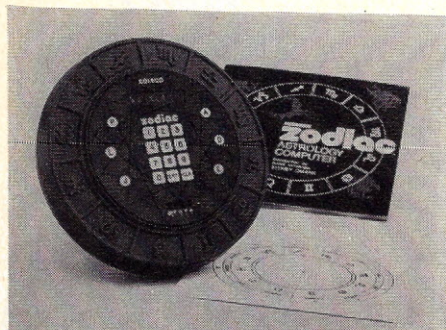
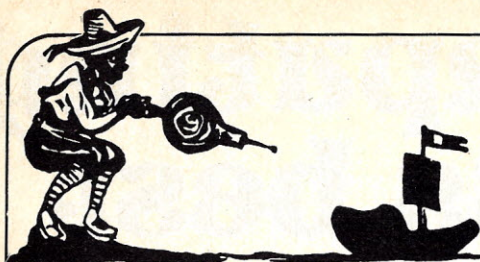


## To Order

Use the bound-in order form or send your check for books plus \$2.00 shipping and handling per order (Foreign: \$1.25 per book) to Creative Computing, P.O. Box 789-M, Morristown, NJ 07960. NJ residents add 5% sales tax. Visa or MasterCard are acceptable also. For faster service, call in your bank card order toll free to:

**800-631-8112**  
(in NJ call 201 540-0445)





## COLECO

Arnold Greenberg, President of Coleco, explains **Zodiac** — The Astrology Computer. "This product is definitely not a toy. The unit's memory chip contains astrological data scientifically computed and checked out. It's much more personalized and specific than anything the consumer might find in a newspaper astrology column or in a yearly astrology book, since **Zodiac's** output is based on astrological conditions computed from information entered by the person asking for the advice."

Using **Zodiac** in conjunction with its companion manual edited by astrologer Sydney Omarr, the user can get the same kind of in-depth, personalized astrological information that formerly was available only from a professional astrologer. **Zodiac** provides three different types of information:

- \* In its horoscope mode, the user can get a computer readout of the planetary positions at the time of birth and a list of corresponding personality characteristics for people born at that time. With this information plus the additional data found in the manual, the user can chart horoscopes for anyone simply by knowing his or her date of birth.

- \* In its daily preview mode, **Zodiac** can guide one's actions by telling how the stars appear for any day—past, present, or future.

- \* In its advice mode, **Zodiac** will give answers to a broad variety of questions.

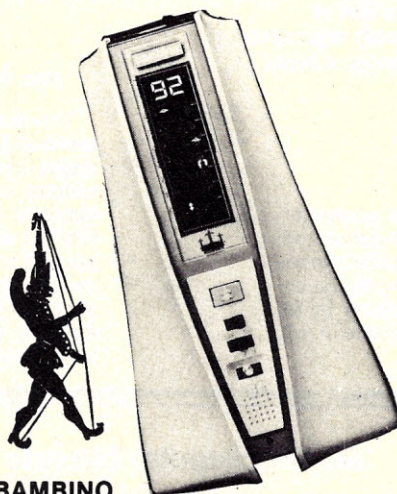
"Whether a consumer really believes in astrology, or just thinks the idea is fun, this is a product with tremendous appeal," Greenberg stated.

**Head To Head Electronic Basketball** is a hand-held game which can be played against the computer, or against an opponent. It features fully controllable offense and defense. The offense has a moving ball to pass and shoot, while the defense attempts to block the shot. The LED display shows all the action as well as the game statistics: score, time remaining and 24 second countdown.

Electronic sound effects highlight the action, and the two skill levels—Pro and Semi/Pro—create a challenge for any age level.



Coleco also introduced **Head to Head Electronic Football** and **Hockey**, as well as two new Quiz Wiz book assortments (7 books in total). We're glad to see that because all too often games are brought out one year with no corresponding follow-up on software in succeeding years. Our applause to Coleco.



## BAMBINO

In **UFO Master Blaster Station** you attempt to use your rockets to intercept aliens invading from above. Different skill levels and "space age" sounds. The game is claimed to use "the world's smallest graphic color display."

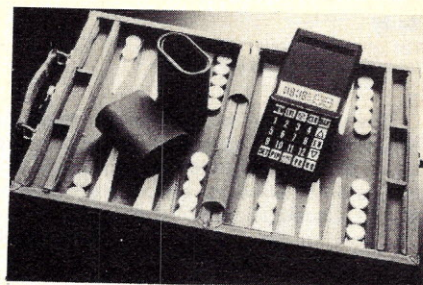
A series of seven hand held electronic "video" games includes **Football**, **Ice Hockey**, **Soccer**, **Space Gun Fight**, **Police Car Chase**, **Boxing**, and **Safari**.



## TIGER

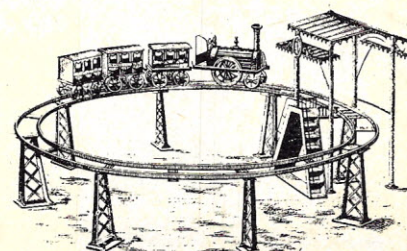
Hand-held **Rocket Pinball** features LED targets, electronic sound effects, free ball and bonus scoring.

**Sub Wars** creates the illusion of a W.W. II submarine on the hunt, complete with snap-on protruding handles that allow the player to hold the game like a submarine skipper operating a periscope. Sound effects such as sonar beeping and torpedoes firing heighten the realism. In **Baseball**, one or two players control batter, fielders, base-runners, and pitcher with unlimited change-up possibilities. **Half-Court**, a basketball game for one or two players, features LED player-action lights, digital scoring with two-player memory, and four-quarter timing. **Copy Cat** is yet another copy of Touch Me/Simon.

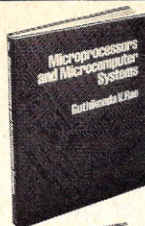


## CARDINAL

**Omar Backgammon** and **Chess** are Cardinal's first electronic game entries. We'll report on how they stack up when we get a sample.







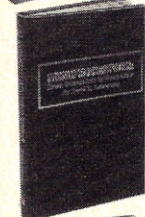
**783/659  
MICROPROCESSOR  
AND  
MICROCOMPUTER  
SYSTEMS**

by G. V. Rao  
Pub. price, \$24.50  
Club price, \$19.50



**786/372  
REAL-TIME  
PROGRAMMING  
WITH MICRO-  
COMPUTERS**

by R. C. Turner  
Pub. price, \$16.95  
Club price, \$13.95



**784/71X  
MINIPROCESSORS**

by D. Heiserman  
Pub. price, \$9.95  
Club price, \$8.45



**784/914  
THE Z-80 MICRO-  
COMPUTER  
HANDBOOK**

by W. Barden, Jr.  
Pub. price, \$8.95  
Club price, \$7.60



**654/158  
PROGRAMMING  
LANGUAGES**

by A. B. Tucker, Jr.  
Pub. price, \$22.00  
Club price, \$16.50

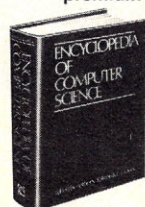


**786/119  
IMS  
PROGRAMMING  
TECHNIQUES  
A Guide To Using  
DL /1**

by D. Kapp &  
J. F. Leben  
Pub. price, \$17.95  
Club price, \$13.95

**784/604  
PROGRAM  
BEHAVIOR:  
Models and  
Measurements**  
by J. Spirn  
Pub. price, \$17.95  
Club price, \$14.25

**785/201  
MICROPROCESSOR  
SYSTEMS DESIGN**  
by E. E. Klingman  
Pub. price, \$19.50  
Club price, \$15.95



**769/01X  
ENCYCLOPEDIA  
OF COMPUTER  
SCIENCE**  
by A. Ralston &  
C. L. Meek  
Pub. price, \$60.00  
Club price, \$39.95

**784/957  
57 PRACTICAL  
PROGRAMS &  
GAMES IN BASIC**

by K. Tracton  
Pub. price, \$10.95  
Club price, \$9.30



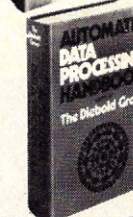
**435/278  
MICROPROCESSOR  
APPLICATIONS  
MANUAL**

by Motorola, Inc.  
Pub. price, \$35.00  
Club price, \$25.00



**168/075  
AUTOMATIC DATA  
PROCESSING  
HANDBOOK**

Edited by The  
Diebold Group,  
Inc.  
Pub. price, \$34.95  
Club price, \$23.75



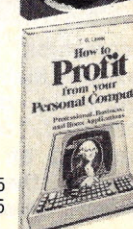
**773/009  
MINICOMPUTERS:  
Structures and  
Programming**

by T. G. Lewis &  
J. W. Doerr  
Pub. price, \$13.95  
Club price, \$11.75



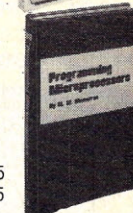
**786/461  
HOW TO PROFIT  
FROM YOUR  
PERSONAL  
COMPUTER**

by T. Lewis  
Pub. price, \$7.95  
Club price, \$6.75



**770/913  
PROGRAMMING  
MICRO-  
PROCESSORS**

by M. W.  
McMuran  
Pub. price, \$9.95  
Club price, \$8.45



# Introductory offer to new members of the COMPUTER PROFESSIONALS' BOOK CLUB

**any two  
of these great  
professional books  
for only  
\$2.95  
values up  
to \$69.95**

**Two special bonus books come to you  
for \$2.95 with your first club selection**

Books are selected from a wide range of publishers

Be sure to consider these books as well—

"This Title counts for two  
premium books"

## save time and money by joining McGraw-Hill's COMPUTER PROFESSIONALS' BOOK CLUB



**T**HIS professional club is designed to meet your day-to-day on-the-job needs by providing practical books in your field on a regular basis at below publisher prices. If you're missing out on important technical literature—if today's high cost of reading curbs the growth of your library—here's the solution to your problem. The Computer Professionals' Book Club was organized for you, to provide an economical reading program that cannot fail to be of value. Administered by the McGraw-Hill Book Company, all books are chosen by qualified editors and consultants. Their understanding of the standards and values of the literature in your field guarantees the appropriateness of the selections.

How the Club operates: Thirteen times a year you receive free of charge The Computer Professionals' Book Club Bulletin. This announces and describes the Club's featured book of the month as well as alternate selections available at special members' prices. If you want to examine the Club's feature of the month, you do nothing. If you prefer one of the alternate selections—or if you want no book at all—you notify the Club by returning the card enclosed with each Bulletin.

As a Club Member, you agree only to the purchase of four books (including your first selection) over a two-year period. Considering the many books published annually, there will surely be at least four you would want to own anyway. By joining the club, you save both money and the trouble of searching for the best books.

## MAIL THIS COUPON TODAY

**COMPUTER PROFESSIONALS' Book Club**  
P.O. Box 582, Hightstown, New Jersey 08520

Please enroll me as a member and send me the three books indicated. I am to receive the two bonus books at the introductory price of \$2.95 plus my first selection, plus tax, postage, and handling. If not completely satisfied, I may return the books within 10 days and request that my membership be cancelled. If I keep the books, I agree to take a minimum of three additional books during the next two years at special Club prices (guaranteed 15% discount, often more). I will receive the Club Bulletin 13 times a year. If I want to examine the featured selection, I need take no action. It will be shipped automatically. If, however, I want an alternate selection—or no book at all—I simply notify the Club by returning the convenient card always enclosed. I will always have a minimum of 10 days in which to return the card and you will credit my account fully, including postage, if this is not the case. Membership in the club is continuous but cancellable by me at any time after the four-book purchase requirement has been filled. This order subject to acceptance by McGraw-Hill. Orders from outside the continental U.S. must be prepaid. Company, business, or institutional tax exemption status is not applicable to purchases made through individual Club memberships. All prices subject to change without notice. Offer good for new members only. A shipping and handling charge is added to all shipments. Members are billed when books arrive.

Write Code # of 1st bonus book selection here	Write Code # of 2nd bonus book selection here	Write Code # of 1st book selection here
<input type="text"/>	<input type="text"/>	<input type="text"/>

Name

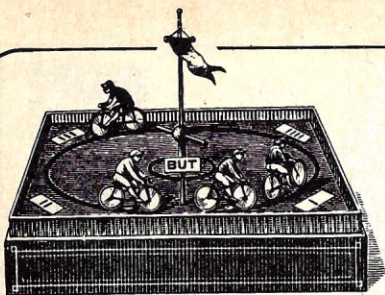
Address

City  State  Zip

**EXTRA SAVINGS:** Remit in full with your order, plus any local and state tax, and McGraw-Hill will pay all regular postage and handling charges.

P39397





## MATTEL

To its growing, self-contained electronic products line, Mattel adds seven hand-held games and a personal entertainment product. Leading the list of hand-held games is a more sophisticated version of The Electronic Football Game—"Mattel



Electronics" **Football II**. This game includes kick-offs and runbacks, the ability to manipulate the runner backward, and a passing option featuring an offensive receiver. In addition, there are three new sports games, **Baseball**, **Soccer** and **Hockey**; two action games, **Sub Chase** and **Armor Battle**; and a strategy game, **Brain Baffler**, com-



binning a number of popular word and strategy games with multiple variations and sound effects.

A new product, the **Horoscope Computer**, will electronically display an individual horoscope forecast relating to specific areas of life—love, job, money, friends, etc—or evaluate the compatibility of two specific people.



## VANITY FAIR

**Electronic Bowling** has LED readouts which show scores and frames, appropriately complemented by flashing lights and sounds when a spare or strike is achieved. The players (or player) can even "throw" a straight ball or hook as they choose.



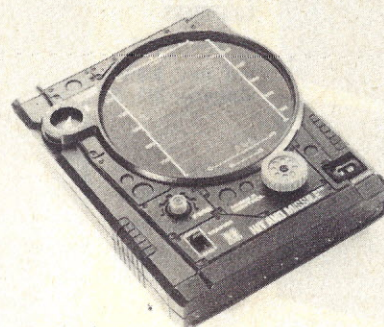
Each talking head in Playskool's **Double Talk** has a movable mouth which the child controls remotely along with a microphone/amplifier to make it talk.



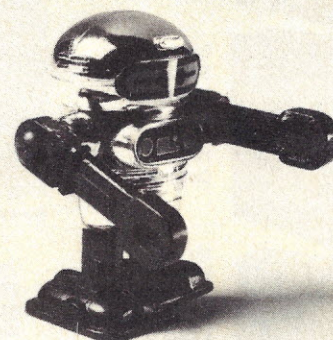
Invicta's **"Walt Disney Character Mastermind"** only has three mystery digits — so it's really **Bagels** in disguise. To the right is **"Space Lines,"** a fast-moving logic game which we enjoyed immensely at the Toy Fair.

## TOMY

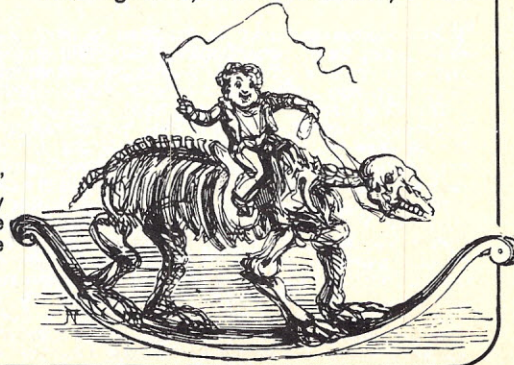
Although electro-mechanical, Tomy's new entries are very similar to electronic games. **Digital Diamond** is a baseball game in which the pitcher chooses to pitch a fastball or curve. The ball, in the form of a light-emitting diode, heads for the plate. The batter swings and the result of the play lights up on the **Digital Diamond**



scoreboard. In **Hit & Missile** a player controls anti-aircraft missiles on the ground against enemy aircraft. A player can change the course of the missile even after it's been fired.



**Acrobot** is a wind-up robot with a heart. When he falls over or gets knocked down, he gets up by himself. He takes life's hard knocks, picks himself up, and gets back on his feet. Of course, he does a cute little robot walk, but what sets him apart from other metal men is his never-say-die personality. (Yes we know this doesn't belong in a review of electronic games, but he was cute!) □





# Build your own microcomputer as you learn computer technology at home.

New from NRI! The Most Complete and Up-to-date Home Study Course Ever Offered

As the microprocessor revolutionizes the computer world and microcomputers appear almost everywhere, NRI brings you a new, convenient, and effective way to keep up with this expanding technology. It's NRI's Computer Technology Course, created and designed exclusively for learning at home in your spare time.

## Featuring NRI's Exclusive Dual Language Microcomputer

NRI goes beyond book learning to give you practical, "hands-on" experience in designing circuitry, interfacing components, programming, and troubleshooting. As you learn, you actually assemble NRI's designed-for-learning microcomputer, incorporating the latest advances in the state of the art. It looks and operates like the finest of its kind, actually does more than many commercial units. But NRI engineers have designed components and planned assembly so it demonstrates important principles, gives you working experience in detecting and correcting problems. And it's yours to keep, put to work in your own home or business.

You also build and keep your own test instruments, including a transistorized volt-ohm meter and CMOS digital frequency counter. And NRI's Discovery Lab® broadens your horizons with specialized experiments and theory demonstrations.

## The Proven Way to Learn at Home

You don't have to worry with travel, classes, or time lost from work when you learn the NRI way. As they have for more than 60



years of teaching technical subjects, NRI brings the material to you. You study in your spare time, at your convenience, using "bite-size" lessons that program material into logical segments for easier assimilation. You perform experiments and build equipment using kits we supply. And your personal NRI instructor is always available for consultation should you have questions or problems. Over a million students have already shown the effectiveness of NRI training.

## Choice of Courses

Several courses are available, depending upon your needs and background. NRI's Master Course in Computer Technology starts with the fundamentals, explores basic electronics and digital theory, the total computer world, and the microcomputer. The Advanced Course, for students already versed in electronics and general computers, concentrates on the microprocessor and microcomputer. In both courses, you build all instruments and your own computer.

## Send for Free Catalog... No Salesman Will Call

Get the details on these exciting new courses in NRI's free, 100-page catalog. Shows all kits and equipment, lesson outlines, and full information, including facts on other electronics courses. Mail the coupon today and we'll rush your catalog. No salesman will ever call. Keep up with the latest technology as you learn on your own computer. If coupon has been removed, write to NRI Schools, Computer Department, 3939 Wisconsin Ave., Washington, D.C. 20016.



**NRI Schools**  
McGraw-Hill Continuing  
Education Center  
3939 Wisconsin Avenue  
Washington, D.C. 20016

### NO SALESMAN WILL CALL

Please check for one free catalog only.

- ☐ Computer Electronics Including Microcomputers
- ☐ TV/Audio/Video Systems Servicing
- ☐ Complete Communications Electronics with CB • FCC Licenses • Aircraft, Mobile, Marine Electronics
- ☐ CB Specialists Course
- ☐ Amateur Radio • Basic and Advanced



All career courses approved under GI Bill.  
☐ Check for details.

- ☐ Digital Electronics • Electronic Technology • Basic Electronics
- ☐ Small Engine Repair
- ☐ Electrical Appliance Servicing
- ☐ Automotive Mechanics
- ☐ Auto Air Conditioning
- ☐ Air Conditioning, Refrigeration, & Heating Including Solar Technology

Name \_\_\_\_\_ (Please Print) Age \_\_\_\_\_

Street \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Accredited by the Accrediting Commission of the National Home Study Council



# Word Processing Systems: Points To Consider

## Irwin Doliner

Word processing can be useful to a wide range of people — from the two finger hunt-n-peck typist to the professional who types in excess of 80 words per minute. In fact, anyone who has occasion to type could benefit from a word processing system.

The two finger typist usually types slowly and deliberately to avoid errors — and normally makes several anyway. It is very painful to have to retype a page which took an hour to type the first time. If this describes your typing method, a word processor will permit you to type as fast as you want without being concerned about errors. The editing functions may be used later to correct all mistakes. Once editing is finished you can automatically produce as many error-free copies as you need.

The professional typists will no longer need white-out or correction tape. Errors may be corrected either while typing, or after the typing is completed, by using the edit functions. Total output will be increased with much less fatigue.

The lawyer may create a legal document automatically by combining previously edited paragraphs. The global edit, if it is available, may be used to change all references to "Blivitz & Son", in an existing document, to read "Framis, Inc." and thereby produce a tailored contract painlessly and free of errors.

If you have a new product to announce you may send an original copy of a form letter individually addressed to each prospect in your list. You may also include special comments on selected letters.

You could produce a maintainable catalogue, a business directory and program documentation. In fact, the potential applications for a word processor are limited only by your imagination and the features available on the particular system you select.

Once you establish that you need word processing, there are three primary approaches available. You may buy time on a computer that provides word processing, obtain a dedicated word processing machine or buy word processing software for

your own computer. No single approach is right for every situation. Your particular needs will dictate which is right for you.

If you have no computer requirements other than word processing you should consider one of the first two options. You might buy computer time for low volume or infrequent word processing needs. Or you might obtain a dedicated word processing machine for high volume or frequent usage.

However, with computers being involved in virtually every aspect of daily life, it is difficult to conceive of many situations which require word processing but not data processing. The advent of the low cost micro-computer makes the third approach, buying word processing software for your own computer, a very cost effective one in most situations.

The balance of this article will be directed toward those who need to evaluate word processing software — although much of what is said will apply equally to the other two options. I will attempt to be as general as possible in the description of word processing functions but the examples, when required, will be drawn from IDSWORD (the word processing system developed by INTERACTIVE DATA SYSTEMS, INC.). One important point to keep in mind is that no software, word processing or otherwise, can be all things to all people. The final decision to purchase or not to purchase a given software package should be based on how well it satisfies your specific needs, and what the economic trade-offs are. The remainder of this article will help you to make these determinations.

There are four primary functional areas served by any effective word processor. They are: 1) data entry, 2) data storage and file manipulation, 3) text editing and 4) reporting. The specific operations included in each of these functional areas will vary from one word processing system to the next. These operations, and how they are performed, should be compared with your checklist of required (or desired) features to determine the acceptability of a given system.

## Data Entry

Ordinarily data is entered manually from a terminal with a typewriter-like keyboard, as in Figure 1. Manual data entry should seem natural to the user, and should be as much like regular typing as possible. Any special operations or artificial techniques make the system more difficult to learn and operate. For example, some word processors may require a line of text to be enclosed in quotes if the line includes a comma or other special character. This requirement is artificial and confusing and will often be forgotten, causing errors in the text. It probably will result in a net reduction in output.

Strict adherence to normal typing restrictions, however, is not always advantageous. For example, a typist is usually conscious of the right margin and must look ahead to determine if the next word will exceed the preset line length. This need to look ahead slows the typist and reduces efficiency. If the typist knew that the system could automatically reformat the text, line breaks could be taken when desired rather than as dictated by the position of the right margin. Optionally, your text may include constants or variables combined with the data entered manually. This might be accomplished by replacing special user supplied indicators with data extracted from other files. One application of this is the preparation of a form letter, as shown in Figure 2. When the form letters are to be printed the operator specifies the date to be inserted in each letter (a constant). Names, addresses and special comments are inserted in the letter as they are extracted from a name and address file (variables). The end result is an original copy of the form letter for each name in the files specified.

A data file may also be created entirely from the contents of existing files with no manual data entry at all, as shown in Figure 3. In addition to the savings in manual effort, there is another big advantage to creating files in this manner. Each file included in the merge has probably been used and proofread several times. The end result is a tailored document achieved painlessly and without errors.



### ESTABLISHING A NEW FILE

## ADDING DATA TO THE FILE

```
NAME OF WORD PROCESSING FILE, DISK DRIVE? SAMPLE,1<cr>
'SAMPLE' FILE OPERATION? TEX<cr>
IS THIS A NEW FILE? N<cr>
5)..This is a continuation of the<cr>
6)..Previous run. Line 8 is soind<cr>
7)..to be left blank.<cr>
8)..<cr>
9).. 'RETURN' was entered on line<cr>
10)..8 to leave a blank line.<cr>
11)..*<cr>
```

## Merging Several Files Into One

```
NAME OF WORD PROCESSING FILE, DISK DRIVE? NEWFIL,1<cr>
'NEWFIL' FILE OPERATION? MER<cr>
SPECIFY FILES IN THE ORDER TO BE MERGED
TERMINATE INPUT WITH SIMPLY 'RETURN'.
FOR EACH FILE GIVE 'FILE NAME,DISK DRIVE'.
#,NAME,DRIVE
1 ? FILE1,1<cr>
2 ? FILE2,1<cr>
3 ? <cr>
```

```
NAME OF WORD PROCESSING FILE, DISK DRIVE? SAMPLE,1<cr>
'SAMPLE' FILE OPERATION? PRI<cr>
DO YOU WANT TO SEE THE DEFAULT LIST? Y<cr>
ITEM  DEFAULT
```

```

=====
1.  NO PAGE NUMBERING
2.  PAPER 11 INCH LENGTH
    PRINT 6 LINES/INCH
    50 PRINTED LINES/PAGE
3.  NO FORCING TO NEW PAGE
4.  6 POS LEFT MARGIN
5.  NO RIGHT JUSTIFICATION
6.  SINGLE SPACE
7.  SINGLE COPY
8.  PRINTING ON LINE PRINTER
9.  PRINTING ON CONTINUOUS PAPER
10. NO CONSTANT DATA REQUIRED

```

```
CHANGE ITEM? 4<cr>
SIZE OF LEFT MARGIN? 3<cr>
CHANGE ITEM? 5<cr>
CHANGE ITEM? <cr>
POSITION PAPER TO TOP OF PAGE & HIT RETURN <cr>
```

For a word processor to be truly effective it must be able to store data for subsequent access. The storage medium normally used is the 'floppy' disk. Data storage means effective file manipulation with human engineering considerations.

Once the user specifies the file name and disk drive he should be done with that end of the operation. The system should be able to determine if the user is attempting to create a file with a name that is already in use, and allow the user to select another name. It should also recognize when the user is attempting to update a file that does not exist, and allow him to specify the name correctly. Without good file handling

```

1)..      Figure 2
2)..
3)..
4)..
5)..
6)..      YOUR ADDRESS
7)..
8)..      *DT*
9)..      *A1*
10)..     *A2*
11)..     *A3*
12)..     *A4*
13)..     Dear *GR*:
14)..
15)..     THE BODY
16)..
17)..
18)..     OF YOUR LETTER
19)..
20)..
21)..     GOES HERE
22)..
23)..
24)..
25)..     Sincerely,
26)..
27)..     YOUR NAME
28)..     enc:*S1*
29)..     *S2*
30)..
31)..
32)..
33)..
34)..
35)..
36)..
37)..
38)..
39)..
40)..     *S3*
41)..
42)..
43)..
44)..
45)..
46)..

```

INDICATOR	MEANING
*DT*	DATE AS SPECIFIED AT RUN TIME
*GR*	NAME AS IT WOULD APPEAR IN THE GREETING SUCH AS MR. DOE (extracted from *NA*).
*NA*	NAME AS IT APPEARS IN THE FILE.
*A1*	FIRST ADDRESS LINE.
*A2*	SECOND ADDRESS LINE.
*A3*	THIRD ADDRESS LINE.
*A4*	FOURTH ADDRESS LINE.
*S1*	FIRST SPECIAL COMMENT.
*S9*	NINTH SPECIAL COMMENT.

```

SCREEN 1:SELECTING A LINE FOR EDIT (cursor is positioned at selected line)
*****
:
:   FEATURES TO CONSIDER WHEN SELECTING A WORD PROCESSOR
:
:
:
*!Word Processing can be useful to a wide range of people - from the
!two finger hunt-n-peck twiist to the professional who types in excess
!of 80 words per minute. In fact, anyone who has occasion to type
!could benefit from a word processing system.
:
!The two finger twiist usually types slowly and deliberately to avoid
!errors - and normally makes several anyway. It is very painful to
!have to retype a page which took an hour to type the first time. If
!this describes your typins method a word processor will permit you to
!type as fast as you want without beins concerned about errors. The
!editing functions may be used later to correct all mistakes. Once

```

```
=====
```

CONTROL COMMANDS		LINES ON SCREEN
		=====
A=ADD LINE    I=INSERT LINE   S=SCROLL UP		1 - 15
D=DELT LINE   K=KEEP DATA   \=CURSOR DN	LINES IN MEMORY	
E=EDIT LINE   R=RESTART     /=CURSOR UP		=====
		1 - 180

```
=====
```

```

SCREEN 2:EDITING A LINE OF TEXT (changing 'wrod' to 'word')
*****
Word processings can be useful to a wide range of people - from the
C #
0.....1.....2.....3.....4.....5.....6.....7.....0
L 5 0 5 0 5 0 5 0 5 0 5 0 5 0

```

```

MODE                EDIT COMMANDS
=====
A = ADD FOLLOWING INDICATED CHARACTER
C = CANCEL CHANGE TO THIS LINE
D = DELETE THE INDICATED CHARACTER
I = INSERT BEFORE INDICATED CHARACTER
L = DELETE FROM THE CURSOR LEFT
R = DELETE FROM THE CURSOR RIGHT
--S = SUBSTITUTE FOR INDICATED CHARACTER
<RET> = EXIT FROM MODE - RETURN TO SCREEN
<ESC> = EXIT FROM MODE
  \ = MOVE CURSOR RIGHT
  / = MOVE CURSOR LEFT
=====

```



these and other conditions would end the job prematurely with confusing error messages. Needless to say, there are many such features to maintain the user's file integrity, and protect him from the possible bad effects of human error.

### Text Editing

Text editing is a very broad area. It includes all operations which alter the text to make it more acceptable to a human user. This definition does not impose any theoretical bounds. But time, money and usefulness dictate that practical bounds must be set. The designer of a word processing system must determine the market to be reached, and the price range of the finished product. These considerations impose constraints on the design of the system.

The intent should be to develop a word processing system which will be useable by secretaries and not just programmers. This implies including those functions most often required in normal typing, and close attention to human engineering. More specialized systems which make use of imbedded commands for control certainly have their applications, but not in a production typing environment.

This philosophy will help define the set of text editing operations to be included. Each operation under consideration should be categorized as necessary; nice to have; might possibly be useful; useless or not worth the development cost or overhead in keeping with the design philosophy. Each potential purchaser should also categorize the various functions according to his needs. If the user and designer categorized these functions similarly, the likelihood is good that the system in question will be acceptable.

Line by line editing is one common technique. This operation

permits the user to insert, replace or delete strings of text on any given line. Not all users will have the same hardware configuration. For this reason editing should be permitted on a printing terminal or on a CRT with an addressable cursor, as shown in Figure 4.

It is frequently necessary to make the same change many times in the text. It is, therefore, useful to have global editing. This provides the ability to find, insert, replace and delete specified strings of data anywhere in the text. Automatic reformatting is another desirable feature and provides the user freedom from concern about the right margin mentioned earlier.

Anyone who has written a long letter or document of some size has probably rearranged paragraphs (or wished they had) so that it reads more smoothly. Or perhaps you have written a manual and found that several sections were nearly identical. It would be nice to be able to move or copy blocks of text from one location to another. The Move operation should include Move, Copy and Delete commands for blocks of data.

Automatic hyphenation is, in many cases, unnecessary, and not worth the cost of including. Hyphenation may be accomplished by table look-up, adherence to some set of rules or some combination of the two. Table look-up involves creating a table of words and acceptable points of hyphenation. Space limitations imposed by floppy disks means that any table on a single diskette will be of limited value. A table that was sufficiently large to cover most contingencies would require a large investment in disk drives and long run times for the look-up operation. Most rules for hyphenation would require costly programming effort and would probably yield comical results in many cases. For example, one rule is to hyphenate a suffix such as 'ing'. This

works fine for a word like 'try-ing' but not for 'w-ing' or 'th-ing'.

### Reporting

The purpose of the fourth function, reporting, is to present data in a useful or pleasing manner. Again the possibilities are unlimited, but common sense dictates that limits must be set. Following are four types of reporting.

The first type of reporting is merely listing the contents of the file together with generated line numbers. The user must know what the file looks like before any editing is performed. The user may list only a portion of the file or the entire file.

Anyone who does volume mailing of documents such as catalogues will appreciate the value of being able to print mailing labels automatically. A mailing label program is a valuable feature for a word processing system to have. Form letters and their format were discussed earlier and they would constitute the third type of reporting available.

The fourth report type is for general printing. It would be used to print documents such as this article. Figure 5 shows the dialogue for printing and the assumed defaults. For example, pages can be numbered starting with any number you specify. Page numbers will appear in one of four locations which you may select (top middle or right, bottom middle or right). Selected lines may be forced to begin a new page even if the preceding page is not full. And all of the other defaults may be over-ridden the same way.

### Conclusion

This treatment is in no way a comprehensive look at word processing. Whole books have been written which do not cover the field. The intent was rather to provide some indication of the more common and useful word processing functions. □

## The System-Z Word Processor + Business System

**\$2899**



### FEATURES

- Full-Sized Disk Drive (Standard)
- Up To Four Disk Drives
- Z-80® Micro-Processor
- CP/M® Disk Operating System
- Printer Interface
- Full Word Processing Capability
- Designed for Business Use

### AVAILABLE LANGUAGES

- BASIC Compiler (Included)
- FORTRAN
- Pascal
- COBOL
- And Many More!

### AVAILABLE SOFTWARE

- Accounts Receivable/Payable
- Payroll
- General Ledger
- Inventory
- Mailing List
- Text Processor
- Plus 500 More!

**CALL OR WRITE NOW!**

**MicroDaSys**

POST OFFICE BOX 36051

LOS ANGELES, CA 90036

(213) 935-4555

CREATIVE COMPUTING





# Introducing the Monday Machine.

**For under \$10,000 we give you Sol<sup>®</sup>, the small computer system for electronic typing and general purpose data processing, to brighten your Monday and speed the workload all the way through Friday.**

Are you looking for a way to handle your typing load faster and far more efficiently? Are you looking for an easy to use electronic typing system that you or your secretary can learn in a matter of hours? And are you looking for a general purpose data processing system capable of doing other tasks around the office such as mailing lists, general ledger, accounts payable/receivable and payroll?

Then you're looking for the Sol "Monday Machine."

**It's simply the best small computer system!**

You can store, edit and print out text as long as 110 pages. You get 750,000 bytes of memory on diskette. Plus a letter quality SolPrinter that runs at

480 w.p.m. And a video monitor.

For the past few months, we've been selling our Sol Systems to selected businesses prior to formal introduction. One of our customers, a legal firm, uses their Sol System to type wills and contracts. Precedents and standard paragraphs are stored on diskettes for easy access.

The staff of this law firm was trained to use the Sol System on a Saturday. By the next Friday, no one could figure out how the workload was handled without it. The secretarial staff told us our keyboard has a nicer feel than that of the well-known maker of typewriters and computers. When they aren't using the Sol System for word processing, they do the legal accounting and update the work-in-progress report.

**Processor Technology knows computers and knows programs.**

In the past two years, more than 10,000 Sol computers have been installed.

We're easily one of the most successful pioneers in the small computer field because our systems are sophisticated yet easy to use.

**More information or a demonstration**

Arrange for a demonstration now. Dial the toll free number below to find your local dealer. Or send in the coupon.

**Processor Technology**

Processor Technology Corporation CC  
7100 Johnson Drive, Pleasanton, CA 94566

- ☐ Please send more information on your electronic typing and general purpose data processing system.  
☐ Please arrange a demonstration too.

Name/Title \_\_\_\_\_

Firm \_\_\_\_\_

Telephone \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

**TOLL-FREE DEALER LOCATOR HOTLINE (800) 227-1241. In CA (800) 972-5951.**

Dealerships available in selected areas.

Come see our exhibit at NCC in New York, June 4-7, 4th floor at booths 4048, 4050, 4052 and 4054.

CIRCLE 208 ON READER SERVICE CARD



# Beyond The Text Editor

Derek Kelly

When 1978 was drawing to a close, I decided that I would rather have a computer than a car; and, so, it was that I discovered that along with the three blessings that the wise have told us are sure to make us happy, there was not only the fourth thing (understanding) that I had already added to the three, but also using a computer had to be a fifth.

Over the past several months I have "read" and studied the programs of others so as to learn better how to program on my own, and I have marveled at the ingenuity of many programs. I have longed for the day when I too could construct with ease those complex and intricate programs that are so plentiful in the magazines and software houses supplying users of microprocessors. Perhaps it is only because I am unsophisticated and inexperienced in the use of my Apple II, but I have found that those programs which are most useful to me are also the most simple. Thus, while I enjoy using the relatively complex text editor program that I purchased, the ones that help me most are the simple programs I use to record bibliographies, take and retrieve notes on books I have read, and ones which give me fast access to words. Perhaps, I thought, someone who is wondering what there is beyond the generally forgettable games and business programs which are rife in the marketplace, might find some use for the simple programs that I use.

One of my programs that I use the most in my (writing) work is an index to Roget's Thesaurus. Using the "Data" statement, all 1042 words which constitute the basic categories of words in the Thesaurus were recorded and two simple subprograms are used to search that data base. One subprogram is used to input a word that I would like to know corresponds to the data words or not. This subprogram can be incorporated with simple changes in any program with a similar aim:

```
10 Home: Rem to clear screen
15 Input "Word to be found: "; F$
20 Restore
25 Read N: Rem number of words
   in data base
```

```
30 For I = 1 to N
35 Read W$(I): Next I: Rem W$ =
   words in data
40 If W$(I) = F$ then 90
45 Next I
```

Since I want to know if an input word (F\$) corresponds exactly to a data word, and if there is a related version of the word or a word which matches the first five, four or three letters of the input word, the above program includes two or three additional loops as follows:

```
50 Print "Word not found...But
   try this one:"
55 For I = 1 to N
60 If Left$(W$(I), 5) = Left$(F$, 5)
   Then 90
65 Next I
70 For I = 1 to N
75 If Left$(W$(I), 4) = Left$(F$, 4)
   Then 90
80 Next I: Rem add another
   For...Next loop for 3 letters
85 Goto 100: Rem Prints "No
   such word" & returns to 15
90 Print I " " W$(I)
95 Goto 10
```

The reason why there are two or three separate loops using the Left\$ function is simply that if each loop were nested within the other, then if the word (F\$) were "intention" (which is not in the Thesaurus data base) the program would return "integer" whose first four letters correspond to "intention" rather than "intend" whose first five letters match the word I entered. That would occur because "integer" is alphabetically prior to "intention." Nested For Next loops just would not work for such a program.

Another simple program is the one I use to record notes of books I am reading. I use the variables S\$, A\$, T\$, TN\$, P\$, Y% to record the Subject, Author, Title, Town, Publisher and Year (in that order) in one Data statement, then I use the variables P% and D\$ to record up to five notes and page numbers per book. The Data appears as follows:

```
200 Data 1: Rem number of
   books
210 Data Computer Science,
   Edger W. Dijkstra, A Dis-
```

cipline of Programming,  
Englewood-Cliffs, Prentice-  
Hall, 1976

220 Data 1, executorial abstraction is basic to the notion of an algorithm

230 Data 1, executorial abstraction functions to map different computations on one another

240 Data 1, executorial abstraction is a way of helping us to get an intellectual grip on a computation by considering it as a species of a class of computations

250 Data 0, none, 0, none: Rem this is how I record Data for which no notes exist but which are needed for program execution

I use several different subprograms to operate on these notes. One prints out only the titles, another the authors, another complete information on each book together with notes, and another which prints out only the title and its corresponding notes. If there are more than five notes and page numbers per book, then I simply add 1 to the number of books (line 200 in example) and give an abbreviated documentation of the book, then continue with the notes. A simple program to operate on such data statements is:

```
10 Restore
15 Read N
20 For I = 1 to N
25 Read S$, A$, T$, TN$, P$, Y%
30 For J = 1 to 5: Rem 5 is limit I
   set on number of notes.
35 Read P%, N$
40 Print T$
45 Print Chr$(91)P%"] "N$; Rem
   Chr$(91) is required by an
   Apple II to print the left hand
   square bracket (I)
50 Get A$: Rem this gives user
   control and time to read
   Notes
55 Next J: Rem Next line of
   notes
60 Next I: Rem next book
```

Clearly, lines 40 and 45 can be changed to suit a user's purposes. For instance line 40 could be Print Y%



if only information on the year a book was published is required. The Chr\$(91) function is used in line 45 simply because it helps if the page number is demarcated by square brackets in the print out.

I also keep an extensive annotated bibliography for many different subjects and areas. The program listed immediately above can be used in modified form (excluding lines 30, 35, and 55 which handle the notes) to read and print out books in a subject-area, together with annotation, or only annotations, or whatever I need at the moment.

Since I read 2 to 300 books a year, and usually take extensive notes on many of these, having a computer-based system to record bibliographies and notes has changed my note storage habits and has immeasurably simplified my research. Now instead of the reams of paper and numerous pens and folders that I had to use before, notes and bibliographies are all on one or two cassette tapes! And, instead of that once wearying search through my notes for some point I remembered about and wanted to use, all I do is LOAD, RUN and let my Apple do the looking.

Now, while it would indeed be gratifying if the simple programs noted above were of use to some other person, there is a persistent and pernicious myth that I call the 'myth of the painted lady' that has trapped many a writer (particularly college-based ones in my experience) into believing that if only an efficient method of notetaking were found then papers and reports and books could just flow off the typewriter or presses. The myth of the painted lady is based on the idea that research is based on four steps: gather the facts, look for their pattern, test this pattern by examining the facts, then write up the report. The myth is based on the idea that behind all the paint (the facts) there lies a heart of gold (a theory or pattern) if only one looks hard enough. The four steps in research can and never will work—they are based on myth. One must know what one is looking for (have an idea about a pattern) before finding a pattern in facts (statistics notwithstanding). So just because a computer helps to record facts does not mean that the thinking and pattern development will be any the easier than before. It only means that the evidence will be closer at hand, more accessible. Giving us a helping hand with the grunt-work of life and freeing us to think more is one great benefit from using a computer. □

# SBA ANNOUNCES

## a full-screen text editor and word processor that will run on any CP/M-based system

### Editor

- Applicable for both text and program preparation
- All standard features—cut and paste, global search and replace, library files
- Full-screen character manipulation
- Simple, direct control key operation
- Suitable for any serial or DMA terminal
- Direct print features
- Print any file while editing another

### Text Processor

- All standard features—line length and page formatting, headings and footings, flexible pagination
- Simple format for defining external files (e.g., name and address) for form letter generation
- Easy creation of self-prompting fill-in-the-blank documents
- Output to disk, CP/M list device, or special feature printer

Dealer inquiries invited

## small business applications, inc.

3220 Louisiana • Suite 205 • Houston, Texas 77006

CIRCLE 193 ON READER SERVICE CARD



Featuring

**RCA**  
1802 COSMAC

Own a powerful home computer system, starting for just \$99.95—a price that gets you up and running the very first night with your TV set for video display. \$99.95 ELF II includes RCA 1802 8-bit microprocessor addressable to 64K bytes with DMA, interrupt, 16 registers, ALU, 256 byte RAM, full hex keyboard, two digit hex output display, BOARD, LIGHT PEN, ELF-BUG MONITOR, COLOR GRAPHICS & MUSIC SYSTEM, TEXT EDITOR, ASSEMBLER, DISASSEMBLER, VIDEO DISPLAY BOARD, and 5 slot plug-in expansion bus (less connectors) to expand ELF II.

## Write and run programs—the very first night—even if you've never used a computer before!

You're up and running with video graphics for just \$99.95 — then use low cost add-ons to create your own personal system that rivals home computers sold for 5-times ELF II's low price!

More Breakthroughs Coming Soon!

Soon to be introduced: ELF II special application kits... PROM Programmer... A-D, D-A Converter... Controller Board... and more!

So don't be trapped into buying a dinosaur that's already obsolete. An ongoing commitment to develop the RCA 1802 for home computer use by Netronics keeps you right on the outer fringe of today's home computer technology.

Order your ELF II, direct from the factory, with the coupon below! Netronics guarantees your success!

Netronics R&D Ltd., Dept CC-5  
333 Litchfield Road, New Milford, CT 06776

PHONE ORDERS ACCEPTED!  
Call (203) 354-9375



Yes! I want my own computer! Please rush me—

- ☐ RCA COSMAC ELF II kit at \$99.95 plus \$3 postage and handling (requires 6.3 to 8 volt AC power supply)
- ☐ Power Supply (required), \$4.95 postpaid
- ☐ RCA 1802 User's Manual, \$5 postpaid
- ☐ Tom Pittman's Short Course on Microprocessor & Computer Programming teaches you just about everything there is to know about ELF II or any RCA 1802 computer. Written in non-technical language, it's a learning breakthrough for engineers and laymen alike. \$5 postpaid
- ☐ I am also enclosing payment (including postage & handling) for the items checked below!
- ☐ I want my ELF II wired and tested with power supply, RCA 1802 User's Manual and Short Course—all for just \$149.95 plus \$3 p&h.

- ☐ Deluxe Metal Cabinet with plexiglas dust cover for ELF II, \$29.95 plus \$2.50 p&h
- ☐ I am also enclosing payment (including postage & handling) for the items checked below!
- ☐ I want my ELF II wired and tested with power supply, RCA 1802 User's Manual and Short Course—all for just \$149.95 plus \$3 p&h.

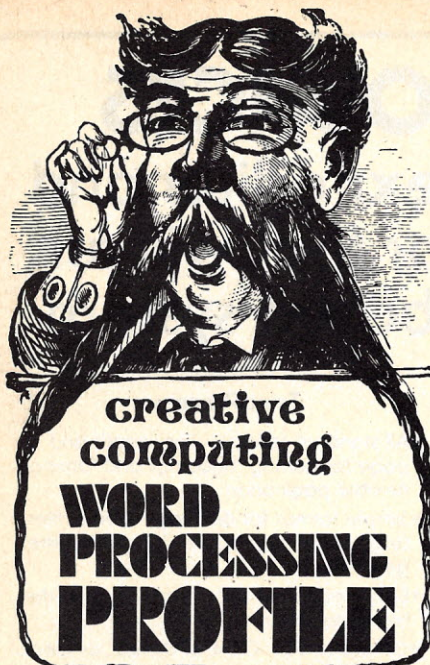
Total Enclosed: \$  
(Conn. res. add. tax)  
**CHARGE IT!** Exp. Date  
☐ Visa ☐ Master Charge  
(Bank # \_\_\_\_\_)  
Account # \_\_\_\_\_

- ALSO AVAILABLE FOR ELF II**
- ☐ **GIANT BOARD™** kit with cassette I/O, RS 232 C/TTY I/O, 8-bit P/I/O decoders for 14 separate I/O instructions and a system monitor/editor. \$39.95 plus \$2 p&h
  - ☐ **Kluge (Prototype) Board** accepts up to 36 IC's \$17.00 plus \$1 p&h
  - ☐ **4k Static RAM kit**, Addressable to any 4k page to 64k. \$89.95 plus \$3 p&h
  - ☐ **Gold plated 86-pin connectors** (one required for each plug-in board). \$5.70 ea. postpaid
  - ☐ **Expansion Power Supply** (required when adding 4k RAM). \$34.95 plus \$2 p&h
  - ☐ **Professional ASCII Keyboard** kit with 128 ASCII upper/lower case set, 96 printable characters, onboard regulator, parity, logic selection and choice of 4 hand-shaking signals to mate with almost any computer. \$54.95 plus \$2 p&h
  - ☐ **Deluxe metal cabinet** for ASCII Keyboard. \$19.95 plus \$2.50 p&h
  - ☐ **Video Display Board** kit lets you generate a sharp professional 32 or 64 character by 16 line upper and lower case display on your TV screen or video monitor—dramatically improving your unexpanded \$99.95 ELF II (fits inside ASCII Keyboard cabinet). \$89.95 plus \$2 p&h
  - ☐ **ELF II Tiny BASIC** on cassette tape. Commands include SAVE, LOAD, ±, ×, ÷, !

- ☐ **ELF II Explodes Into A Giant!** Master ELF II's \$99.95 capabilities, then expand with GIANT BOARD to record and play back programs, edit and debug programs, communicate with remote devices and make things happen in the outside world. KLUGE BOARD to use ELF II as a controller. 4K RAM BOARDS. TINY BASIC. ASCII KEY BOARD. LIGHT PEN. ELF-BUG MONITOR. COLOR GRAPHICS & MUSIC SYSTEM. TEXT EDITOR. ASSEMBLER. DISASSEMBLER. VIDEO DISPLAY BOARD. and more!
- ☐ **26 variables A-Z LET, IF/THEN, INPUT, PRINT, GO TO, GO SUB, RETURN, END, REM, CLEAR, LIST, RUN, PLOT, PEEK, POKE.** Comes fully documented and includes alphanumeric generator required to display alphanumeric characters directly on your TV screen without additional hardware. Also plays tick-tack-toe plus a drawing game that uses ELF II's hex keyboard as a joystick. 4k memory required. \$14.95 postpaid
- ☐ **Tom Pittman's Short Course on Tiny Basic** for ELF II. \$5 postpaid
- ☐ **ELF-BUG™ Deluxe System Monitor** on cassette tape. Allows displaying the contents of all registers on your TV at any point in your program. Also displays 24 bytes of memory with full addresses, blinking cursor and auto scrolling. A must for the serious programmer! \$14.95 postpaid
- ☐ **Text Editor** on cassette tape gives you the ability to insert, delete or edit lines and words from your programs while they are displayed on your video monitor. (Add printer and you can use ELF II to type error-free letters plus insert names and addresses from your mailing list.) \$19.95 postpaid
- ☐ **Assembler** on cassette tape translates assembly language programs into hexadecimal machine code for ELF II use. Mnemonic abbreviations for instructions (rather than numerics) make programs easier to read and help prevent errors. \$19.95 postpaid
- ☐ **Disassembler** on cassette tape takes machine code

programs and produces assembly language source listings to help you understand and improve your programs. \$19.95 on cassette tape.  
**SAVE \$9.00—Text Editor, Assembler & Disassembler purchased together, only \$49.95!** (Require Video Display Board plus 4k memory.)  
☐ **ELF II Light Pen**, assembled & tested. \$7.95 plus \$1 p&h  
☐ **ELF II Color Graphics & Music System Board** kit. \$49.95 plus \$2 p&h  
☐ **ELF II connects directly to the video input of your TV set without additional hardware.** To connect ELF II to your antenna terminals instead, order **RF Modulator**, \$8.95 postpaid.  
**Coming Soon:** A-D, D-A Converter, Controller Board and more!  
Print Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_





Word Master is a word processing system for the PolyMorphic 8813. (Micro Pro has a text editor of the same name reviewed elsewhere in this issue.) It has two separate sections — a text editor and an output formatter.

The 8813 has a built-in triple disk drive and communicates with a keyboard and video screen (16 lines by 64 characters). It can also connect to several kinds of printers.

#### The Text Editor

The editor is the part of Word Master you run to create or modify a document. It is executed by typing `EDIT FILENAME`. Subsequent editing operations are done on a text file on floppy disk, so you can permanently save your text for future reference or changes. The editor is video oriented; that is, you do editing operations by positioning your cursor somewhere in the text and then typing in your additions, changes, or deletions. Anything you do to the text is immediately visible on the screen. This approach to text editing is much easier to learn and use than pointer or line oriented editors, which are throwbacks to times when most people were using hard copy terminals. There are a number of very good pointer oriented text editors available, but it's unlikely anyone but a few computer nuts can fully appreciate or even operate a package like Xitan's Z-TEL text editor.

To enter your text, just start the text editor and begin typing. Errors are corrected by typing the delete key to erase the problem, and then inserting the correction. Control-W deletes an entire word. Other control characters move the cursor around the

screen. You can also move or delete blocks of text, search for a specified string, etc. Overall, the text editor is powerful and simple to run. However, there are two obvious complaints. First, the text editor requires that you type the RETURN key at the end of each line. This is a nuisance for the operator because the way text is broken up into lines on the screen has nothing to do with the way it will be printed out. Other video text editors let you type past the end of a line and automatically jump to a new one when it's time. Second, some of the cursor control functions are done by typing "escape sequences" such as escape-shift-delete (to delete a block of text). Others are simple control characters (control-E find the end of your document). This mix of control characters and escape sequences is not as logical or easy to remember as exclusive use of either one.

#### The Text Formatter

Once you're happy with the contents of your document, you can run the formatter program to print it out. The formatter controls text justification, line widths, margins, page numbering, underlining, centering, beginning a new page, page titling, indenting, paragraphs, etc. Formatting commands must be embedded in the text itself, in curly braces. For example, `(bpg)` in your text file tells the formatter to begin a new page in the printout. `(rj, wid 80)` means to right justify and set the carriage width to 80.

The formatter commands are very flexible. Word Master includes several we haven't seen on other editors (such as one which tells the editor to begin the next odd page, or to skip to a new page if less than x lines are left). Most are mnemonics, such as "lsp" for "set line spacing" or "he" for header. In our initial use of the editor we had to refer to the instructions often but with practice you would probably memorize them.

#### The Manual

The Word Master manual is written for a total novice at computerized word processing and includes

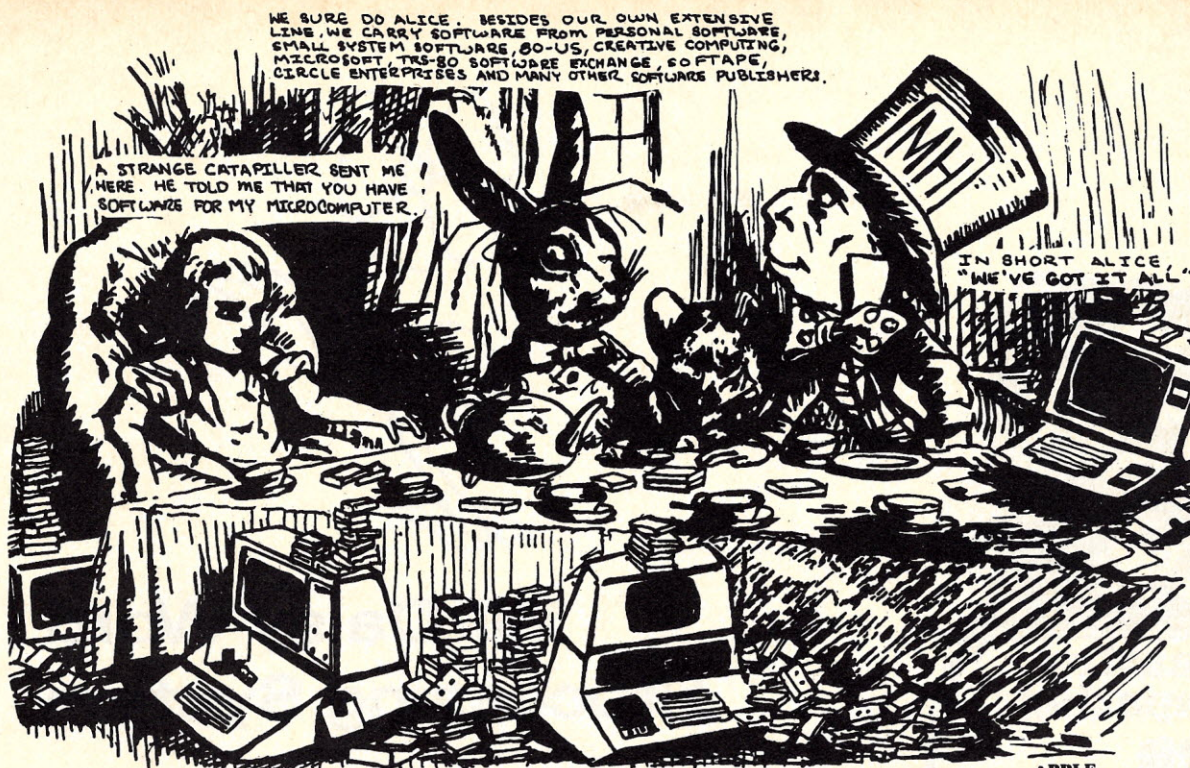
background information on the 8813. It is an admirable effort to be helpful to a non-computer person, but one has to wonder if a secretary wants to study a 125-page manual just to make the funny typewriter work. Those who have used a number of good and bad text editors will probably resent having to slog through pages of "Introduction To The Manual" and "Introduction to System 88 Word Processing" and "Introduction to the Text Editor" and "Introduction to Word Master" and "A First Look at the System 88" (catch my drift?). The quick reference sections are helpful, though.

No one likes to give even a partially critical review and obviously the person who wrote Word Master (Robin Soto) put a lot of effort into it. But software systems for personal computers are getting incredibly sophisticated and need to be human engineered from the start. One should start with an overall master plan of how the system will work, paying attention to interaction with the user, and then move toward a working product. The obvious comparison to make is with Michael Shroyer's Electric Pencil, also video oriented. Versions are available for roughly 40 or 50 machine configurations, including CP/M, North Star Disk, Helios Disk, etc. You should definitely take a look at the Electric Pencil before buying a text editing system. We feel that it is a bit more logical and easier to use than the Word Master. For instance, the editor and formatter are in one package, so that you can sit down and enter and print a document without bothering to save on the disk as an intermediate step. This would seem better for an office application where you don't want to have to unsave every letter you write. The Electric Pencil leaves you with the impression of being a little more finely honed.

Nevertheless, if you already have an 8813 or if other 8813 software such as PolyMorphic's inventory or mailing list programs meet your needs, Word Master is an eminently usable system and produces professional-looking letters and documents with a little practice. □



# MAD HATTER SOFTWARE



PROGRAM	DESCRIPTION	APPLE	TRS-80	L1/2	L2	PET	PRICE
GALACTIC BLOCKADE RUNNER	• AN EXCITING SPACE WAR GAME WITH GRAPHICS	•	•	•	•	•	\$ 9.95
SCI-FI GAME SAMPLER	• 3 GAMES—LUNAR LANDER—STAR MONSTER—SPACE BATTLE	•	•	•	•	•	\$ 7.95
R/T LUNAR LANDER	• A REAL TIME LUNAR LANDER WITH GRAPHICS	•	•	•	•	•	\$ 7.95
MICRO-TEXT EDITOR	• FORMAT TEXT—SAVE & LOAD TO TAPE—OUTPUT TO PRINTER	•	•	•	•	•	\$ 9.95
OTHELLO III	• A STRATEGY BOARD GAME—PLAY AGAINST COMPUTER OR OTHERS	•	•	•	•	•	\$ 7.95
AIR RAID	• A REAL TIME, ARCADE TYPE SHOOTING GAME IN MACH. LANG.	•	•	•	•	•	\$ 14.95
MICRO-CHESS	• PLAY CHESS WITH YOUR COMPUTER—VARIOUS LEVELS OF DIFF.	•	•	•	•	•	\$ 19.95
BRIDGE CHALLENGER	• DON'T WAIT FOR OTHERS TO PLAY—YOUR COMPUTER'S READY	•	•	•	•	•	\$ 14.95
APPLE 21	• BLACKJACK WITH HIRES GRAPHICS	•	•	•	•	•	\$ 9.95
STAR WARS/SPACE MAZE	• SCI-FI GAMES FOR THE APPLE	•	•	•	•	•	\$ 12.95
RENUMBER	• RENUMBER YOUR BASIC PROGRAMS—RENUMBERS EVERYTHING	•	•	•	•	•	\$ 14.95
DISK RENUMBER	• SAME AS ABOVE, BUT ON DISK	•	•	•	•	•	\$ 19.95
PILOT 2.0	• THE EDUCATIONAL LANGUAGE, IN MACH. LANG.—INC. EDITOR	•	•	•	•	•	\$ 14.95
PILOT 3.0	• THE DISK VERSION OF THE ABOVE	•	•	•	•	•	\$ 24.95
APPLE TALKER	• YOUR APPLE SPEAKS! NO NEW HARDWARE REQUIRED	•	•	•	•	•	\$ 15.95
APPLE LIS'NER	• SPEECH RECOGNITION THE EASY WAY—GREAT WITH THE TALKER	•	•	•	•	•	\$ 19.95
TIC-TAC-TALKER	• TIC-TAC-TOE USING SPEECH SYNTHESIS AND RECOGNITION	•	•	•	•	•	\$ 19.95
FORTRAN	• FOR THE TRS-80—SEE MICROSOFT'S ADS	•	•	•	•	•	\$325.00
SYSCOP	• MAKE BACKUP TRS-80 SYSTEM TAPES THE EASY WAY	•	•	•	•	•	\$ 9.95
ANDROID NIM-2	• GAME OF NIM WITH ANIMATED ROBOTS AND SOUND	•	•	•	•	•	\$ 14.95
SNAKE EGG	• A BETTING GAME WITH ANIMATED SNAKES AND SOUND	•	•	•	•	•	\$ 14.95
LIFE 2	• 100 GEN. PER MIN. LIFE & BATTI F OF LIFE W/ANIMATION & SOUND	•	•	•	•	•	\$ 14.95
DCV-1	• PUT SYSTEM TAPES ON DISK EVEN IF IN SAME MEM AS DOS	•	•	•	•	•	\$ 9.95
MUSIC MASTER	• ENTER SHEET MUSIC—THE TRS-80 THEN COMPILES & PLAYS IT	•	•	•	•	•	\$ 14.95
DISK MUSIC MASTER	• SAME AS ABOVE BUT ON DISK W/MANY SELECTIONS	•	•	•	•	•	\$ 24.95
TRS-80 CP/M	• OPENS UP THE WHOLE WORLD OF CP/M SOFTWARE TO THE TRS-80	•	•	•	•	•	\$150.00
PET ASTROLOGY	• DOES ALL THE COMPUTATIONS FOR YOU	•	•	•	•	•	\$ 14.95
PERSONAL FINANCE PKG.	• KEEPS TRACK OF CHECKS, BUDGET, COMPUTES INTEREST	•	•	•	•	•	\$ 9.95
TRS-80 DISK LIB. "A"	• 9 PROGRAMS ON DISK—INC. BLOC. RUN, OTELLO ETC.	•	•	•	•	•	\$ 39.95
BUSINESS AND APPLICATION SOFTWARE—CALL OR WRITE FOR DETAILS							\$ 94.95
16K MEMORY UPGRADE FOR TRS-80, APPLE & SORCERER COMPUTERS							10/\$ 34.95
C-10 HIGH QUALITY DATA CASSETTES W/SCREW HOUSINGS							10/\$ 10.00
VERBATUM 5-1/2 INCH BLANK DISKETTES							

10% OFF IF YOU ORDER 3 SOFTWARE PACKAGES OR MORE      SEND FOR FREE CATALOG—GIVE TYPE OF COMPUTER

## AVAILABLE FROM THESE FINE MICRO COMPUTER DEALERS

J&J ELECTRONICS LTD 28 COLLINGTON AVE. BEXHILL-ON-SEA, E. SUSSEX, ENG.	HOBBY WORLD ELECTRONICS 19355 BUSINESS CENTER DR. #6 NORTHIDGE CA 91324	CAPITOL COMPUTER SYSTEMS 3396 EL CAMINO AVE. SACRAMENTO CA 95821	COMPUTER CABLEVISION, INC. 2617 42ND ST. NW #2 WASHINGTON DC 20007
COMPUTER VILLAGE 931 SW 87TH AVE. MIAMI FL 33174	AUGUST AUTOMATION 28 MILK ST. WESTBORO MA 01581	TRS-80 SOFTWARE EXCHANGE 17 BRIARCLIFF DR. MILFORD NH 03055	KENNEDY SYSTEMS 74 BROAD ST. LYNDONVILLE VT 05851
L. C. SALES 100 HINCHEY AVE. #705 OTTAWA, ONT., CAN. K1Y4L9	THE CPU SHOP 39 PLEASANT ST. CHARLESTOWN MA 02129	OP AMP TECH BOOKS 1033 N. SYCAMORE AVE. LOS ANGELES CA 90038	ADVANCED COMPUTER PRODUCTS 13108 E. EDINGER SANTA ANA CA 92705

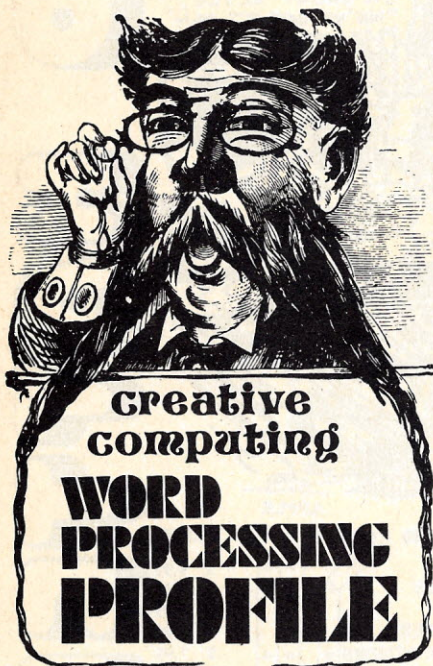


TO ORDER BY PHONE OR FOR DEALER INFO—CALL—(617) 682-8131  
ADD 75c SHIPPING & HANDLING • MASS. RESIDENTS ADD 5% SALES TAX  
MAD HATTER SOFTWARE • 900C SALEM RD • DRACUT, MA 01826

CIRCLE 162 ON READER SERVICE CARD







## WPDaisy Word Processing System

R.W. Hamilton, Jr., Ph.D.

From the moment I first saw a magnetic card typewriter a few years ago, I have been intrigued by the concept of "word processing." As one whose livelihood depends on the written word, I welcomed the prospect of being able to work over a portion of text, making revisions, etc., without having to type the whole thing over each time. Because my reports always seem to get done the last minute before a deadline, the production process has always been particularly frustrating; preparing a handwritten or dictated draft, having it typed, proofreading the typed copy, having corrections made, then having to proofread the corrections. This cycle was often repeated two or three times on very complex material. "Word processing" seemed to be an answer, but the expense of the early systems made them inaccessible to me.

My work involves a lot of reports, and occasionally I have the need for number crunching. This need was not great enough by itself to justify an in-house computer, but as a result of the microprocessor boom it eventually seemed possible to get both word processing and computing functions at the same time. I took the plunge and set up a lease arrange-

ment for a small system, with word processing software.

This is an objective report on WPDaisy, a small system word processor that stands up alongside the best of the dedicated systems. It has some faults, but to avoid confusion between the way it now is and features I'd like to see, my suggestions are collected at the end of the article. Before discussing the system, it might be best to consider what the term "word processor" implies, as it is used here.

### What is a word processor?

For our purpose a word processor handles the written word, and does so with a certain measure of convenience—a pencil or a manual typewriter might otherwise be considered word processors. Three conditions should be met:

- a. Initial typing input should be faster than on a regular typewriter.
- b. Review and extensive editing should be possible, including storing, recalling and moving of text.
- c. It should be possible to print the text out in any desired format, and to make changes in the format with minimal re-typing.

The evaluation of a system, therefore, must consider the convenience and speed of performing these functions, as well as the cost, quality of the output, training required and dependability. I believe that for the most part this excludes simple text editors which are too slow, and the typewriters with one-line displays because of their limited editing capability. Today's standard of dedicated, screen-oriented word processing system includes the Lanier, CPT, Vydec, Norelco and Xerox 850. Since these are expensive (and don't compute), the remaining option is a "small" microprocessor-based computer system with appropriate software. Mine consists of a North Star mainframe with 48K of RAM memory, two 8" Morrow disk drives, a Hazeltine 1500 CRT, a Diablo 1620 printer, and the WPDaisy word processing software (version 00.08).

The computer and components are tied together with TSA's "OS" operating system, which I got with my WPDaisy word processor software. This operating system has worked well for me, a novice in this technology. It is very similar to the Cromemco CDOS system, and will run material configured for CP/M.

R.W. Hamilton, Jr., Ph.D., 80 Grove St., Tarrytown, NY 10591.



## What is WPDaisy?

WPDaisy, like other word processors, has two main functions, a text editor for producing a draft document in the user area of the computer, and a format processor which takes care of the printout. The text editor is available by itself (in which case it is called Daisy), and offers the advantage that it takes up a little less space (7k as opposed to 9k). The term Daisy comes from Dynamic Screen Imaging (tm), and is particularly appropriate since it is generally used with daisy wheel printers. The Daisy editors are specifically designed for use with a normal video terminal for on-screen editing (instead of requiring a memory-mapped video screen). Hardware requirements are essentially those stated above, but one can get by with an 8080 or Z-80 processor having a single disk or diskette and 32k of memory; a proportional printer is nice but not essential. There is a version which runs under CP/M.

WPDaisy uses software techniques to enable its many functions to be performed on a standard keyboard; dedicated word processors use special keys and logic hardware to handle the same functions. As a result, WPDaisy is somewhat complex and requires a little effort to learn. While this may make a typist's initial encounter with it somewhat imposing, the return is a great deal of versatility. There are different ways of doing almost everything that the system will do. The operator of WPDaisy is actually preparing a PROGRAM which causes the computer to produce a portion of written text.

WPDaisy operates by means of on-screen commands for text input and editing and uses formatting control statements imbedded in the text to control the printout. The editing commands are either keyed in individually or entered on the command line. Certain conventions are used for designating these functions in the manual; a simplified list is given in Table 1, primarily to make the examples understandable.

Many of WPDaisy's control and editing commands are based on the use of the "Control" and "escape" keys. The control key is used like the shift key—it does nothing when pressed by itself, but when it is held down and another key is pressed, the function of the other key is modified. This function is generally represented by the "up arrow" or carat symbol used before the character to be modified; thus, control U is represented by ^U. The escape key is different; it is a character itself. As a control function it is used to modify the next key

Table 1  
Partial listing of WPDaisy control and edit functions

- [ES] denotes the "escape" character as used to set off formatting statements. The escape key also flips the cursor to the command line when in the edit mode.
- ^ denotes the "control" key, pressed with another key in the same way as the shift key is used. A control U would be represented by ^U.
- ^W moves cursor up. ^A, ^D, and ^Z move cursor left, right and down, respectively.
- ^X deletes the character marked by or "under" the cursor.
- ^V inserts a single character in front of cursor's position.

The following symbols are used on the command line:

- B moves cursor to beginning of text. -B moves it to the end; H moves it to the home position, -H moves it to bottom of screen.
- Cx clears buffer, text, screen, and printer, where x = B, T, S, and P, respectively. Buffers (/A, etc.) and text are deleted; screen is cleared and refilled from memory, printer program is cleared.
- Dx deletes steps, where x = C, W, L, B, P, S for character, word, line, block, page or screen, respectively.
- Fx finds text string which follows; replacement text then follows ^Z.
- I inserts a line of text in front of cursor; L adds carriage return.
- Mx moves text to buffer or disc using x = same steps as delete.
- Px prints to disc, CRT or printer; -pf-reviews entire text on screen.
- Q quits WPDaisy and returns to operating system.
- Rx reads from buffer or disc file.
- Sx shifts cursor using same steps as delete and move; ST moves next line to top of screen.
- Wx writes entire text to file x and sets up backup file.

pressed.

From the user's point of view, the screen actually takes on a total of four different configurations as text is processed from initial input to final printout. These include bulk insert, edit, preview and printout modes. The preview capability gives the user a chance to see on the screen what the final printout will look like and is one of the excellent features of WPDaisy.

## Initial text input

When the WPDaisy program is loaded, a title appears and the system

is in the "screen edit" or text mode. The user can begin typing immediately, and the material typed is simultaneously stored in memory and displayed on the screen. A fast typist may get ahead of the input in this mode, particularly when a lot of material is in the text area of the computer.

Normally, input is made in the "bulk insert" mode which, when selected, displays a blank screen and will accept typing without speed limitations and without the necessity of putting in carriage returns at the ends of the lines. Minor editing is possible in this mode; back spacing deletes individual characters and the entire line can be deleted. (This is done with control U or ^U, which is the same command used by the main operating system). It is not possible to go back to a preceding line in this mode. Hitting the escape key twice returns the system to edit mode and inserts the text just typed in front of the place where the cursor was at the time the bulk insert mode was selected. As much text can be put in with this mode as the memory will hold. Text can also be brought in from disc files; more about this later.

## Editing text

Once a body of text has been entered, it can then be edited, changed in a variety of ways. This involves a number of functions, including cursor movements, display of portions of text on the screen, insertions, deletions, changes, etc. Some of these functions are invoked by individual key strokes, others by means of mnemonic commands.

Simple text changes are made by directly typing over the text to be changed, letter for letter. Characters can also be deleted or added one at a time. Control X (^X) deletes the character marked by the cursor, and when ^V is pressed the next single key pressed is inserted in front of the position of the cursor.

For moving the cursor around on the screen, the system provides controls useable on any CRT terminal keyboard. Pressed simultaneously with the control key, ^W is up, ^A is left, ^D is right and ^Z is down. Note that these make a diamond on the keyboard. A more convenient arrangement is available with the Hazeltine 1500.

More advanced edit functions are invoked by means of "escape commands," using the "command line." Pressing the escape key when in the edit mode leaves the cursor where it was, functionally, but moves it physically to the top line of the screen



## WPDaisy con't...



Hamilton's system as used with WPDaisy. The printer at left is a Diablo model 1622, and the CRT is a Hazeltine 1500. The North Star mainframe, on its side, is seen at the left under the Diablo and the Morrort (Thinker Toy) disc drives are to the right of it. An old television console holds the entire system, with room for documentation, discs, etc.

and displays a few underlines. Commands are entered on this line according to a consistent format, and the command is executed by pressing the return key. Commands have an optional number, sometimes with a sign, a letter or two, and possibly a text string or file name. The command letters are mnemonic, generally the first letter of the function, such as I for insert, R for read, and Q for quit (leave the editor and go back to the operating system). These letters, as all controls and commands in WPDaisy, can be either upper or lower case; for simplicity, only upper case letters are shown here.

Certain functions use a sequence of "steps." These are designated by letters, shown in the following chart; delimiters used by the program to define the steps are given in parentheses after the steps:

Command Character	Step	Delimiter
C	character	
W	word	(space, tab, CR, LF, FF)
L	line	(CR, LF, FF)
B	block	(LF, FF)
P	page	(FF)
S	screen	(23 lines)

Both forward and backward steps can be used.

Once a few pages of text have been entered it may be necessary to view portions of it on the screen. WPDaisy allows this by a variety of commands, using the command line and the "steps" mentioned above. These are in addition to the keystroke controls. The cursor can, for

example, be shifted to the beginning (B) or end (-B) of the text in memory, to the "home" position on the screen (H), or to the last line (-H). To "shift" the cursor forward or backward a number of steps the typical command sequence is used, including a sign, a number, the command S, and the step desired. Moving the cursor to near the bottom of the screen and using ST on the command line shifts the last line or two to the top of the screen and displays the next screen full of text from memory. This is the nearest thing to scrolling that WPDaisy has (in the edit mode). My writing habits involve working over a text quite a bit after it has been entered, and when I work directly with WPDaisy, I find this aspect of WPDaisy a bit inconvenient. It would be much less a problem for a secretary correcting a written text. Although any portion of the text can be displayed, and by a variety of means, I feel it takes too many keystrokes to move forward through the text. This is discussed in more detail in the critique at the end of this article.

Like many text editors, WPDaisy includes "find" and "find and replace" functions. These are especially useful in editing computer programs and in modifying standard documents for different uses. Following WPDaisy's convention, a number, say 5, the command, F, and a text string will find the 5th occurrence of the text string. That is, 5FSmith will find the 5th "Smith" in the text forward of the cursor position and will display it at the beginning of the screen. To change the next 5 occurrences of Smith to Jones, add the command ^Z and the corrected text; 5FSmith-^ZJones.

One measure of the value of a text editor is its ability to facilitate moving around blocks of text. WPDaisy provides several options for this purpose. These include insertions and deletions, and the use of buffers and disc files. Deletions have been mentioned; this function is invoked by use of the command D, preceded by a signed number and followed by the step to be used. 5DW deletes the next 5 words.

Insertions of text are put in just in front of the cursor, either a single line of text typed on the command line after an I, or an unlimited amount of the bulk insert mode mentioned earlier. If an insertion followed by a carriage return is desired the command L can be used. This "line insert" is useful when editing programs.

For routine moving of text, WPDaisy provides 26 buffers, each identified by a slash followed by a letter. Text is moved with the

command M (as usual, preceded by a signed number), the type of step, and the destination buffer (e.g., 5MW/A moves the next 5 words from the cursor's position to buffer A). The text in that buffer can then be inserted in front of a new position of the cursor by a read command, R/A. The "move" command does not delete the original text, hence this is really a copy command, rather than a move.

The buffers can be used for other functions than line-by-line editing, such as major rearrangements, construction of lists, and crude sorting. Text stored in the buffers can be "called" during printout in the same way as disc files (see below). Difficulties with the buffers include the lack of an "append" feature allowing one to add to a buffer. When something is moved to a buffer, whatever was there is lost and no backup is provided. There is not a quick method of telling which buffers are in use.

It is worth pointing out the value of adequate memory for maximum convenience in using WPDaisy. With 32K it was not uncommon for us to fill up the memory—it held about 10 pages. With 48K we have a great deal more freedom, in total text capacity as well as in buffer and text moving capabilities. Of course text movement is not limited to the buffers, as is discussed in the next section.

### Disc file handling

A sophisticated feature of WPDaisy is its handling of disc files. All or part of the text can be moved to one of the discs under a selected file name, either as it is or formatted (acting on the formatting commands). Using the write command, W, plus a file name, a back-up file is created which contains the text which was previously in the file, and the current text is then entered under the chosen file name. A file can be read back into the text area of the processor, or can be introduced into a portion of text as it is being printed out.

One small problem with these disc files is that when they are reviewed on the screen by the "type" command of the operating system, the escape sequences do not show and occasional characters do not show (if preceded by an escape sequence).

A program for merging addresses and form letters is included, but I have not run it as yet.

Discs can be changed during operation of WPDaisy without disturbing the text area, and some of the "built-in" operating system functions can be used, such as displaying the directory or erasing files.



## Printout formatting

A word processor should enable the user to enter the text in a more-or-less unstructured form, then to print it out in most any printed format. It should be possible to do this with formatting commands alone, and little or no retyping of the text itself. By "format," I mean variables such as margins and their justification, line spacing, paragraph indenting and spacing, page length, page headings and numbers, character spacing (e.g., pica or elite), handling of titles, footnotes, columns, centering, underlining, etc. WPDaisy goes a long way toward meeting this general requirement, with varying degrees of convenience for the different functions.

WPDaisy offers two general approaches to the preparation of a formatted document. The simpler approach is to enter the text formatted in the desired way, and just print it directly without formatting control. This is handled by turning off the "fill" function, in which case the spacing will be followed by the printer exactly as it was entered and as it is displayed on the screen. Other functions such as margins, underlining, etc., can be used in this mode.

More generally, a formatted print-

out is desired using formatting statements. Examples of some of these are given in Table 2. A look at these commands reveals one of the problems, not just of WPDaisy but of any word processor that works on a small microprocessor system without special keys. These statements are long when being entered, but are especially so when displayed in the text. Four characters are needed to display the escape character; it is entered by typing an escape and the letter E. The line feed, carriage return and form feed are handled in a somewhat similar manner.

## Default setting

WPDaisy's formatting statements all involve a numerical value, either to switch the function on or off (a 1 or a zero) or to set values such as margins, spacing, indenting, justification, proportional spacing, centering, underlining and others. Default values for each of these are imbedded in the WPDaisy program; they are generally appropriate, but one or two are not as convenient as they could be, in my opinion. The user can set default values at the beginning of a session and they will be invoked until WPDaisy is reentered anew from the operating system; the user cannot make a permanent change.

## Bugs and other crustaceans

This section discusses certain characteristics of WPDaisy which appear to be bugs or design errors, and it touches on a few items which may look like bugs but which, instead, are probably the result of improper user technique.

Strange things sometimes happen at the right margin. When typing in material in the bulk insert mode, the end of the line seems to occur at an arbitrary point, often a few spaces before the margin. This is apparently due to the word break on the line before using up a few characters on the next line, and usually results in no problem on printout.

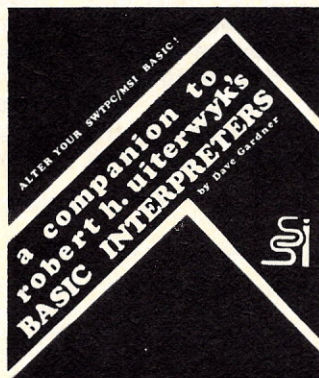
Once in a while, a character gets "stuck" at the right margin and cannot be removed or written over by the usual editing keystrokes. This can usually be cleared by deleting the last part of the line with a line delete and retyping that part. Also, sometimes indenting, spacing, or margins do not behave normally. Sometimes WPDaisy insists on offsetting the normal margin by one or two characters on a single line. This acts as if it were caused by imbedded characters that are not displayed on the screen (it isn't); when the part of the text causing the problem is deleted and replaced, things can be made to work normally. If the character stuck at the



## The S S I Microcomputer Software Guide

Over 2300 programs on tape, disk, published in books and magazines from 130 software sources (with addresses), classified into 230 categories with cross-references. Shipped off the shelf.

Second Edition \$ 7.95



## A Companion to Uiterwyk's BASIC Interpreters by Dave Gardner

70 key memory locations mapped in SWTPC/MSI BASICS plus 30 assembled 6800 routines for ON ERROR GOTO, digit justification, IF THEN ELSE, program length, memory dump and more! With this book you can alter your Uiterwyk BASIC. Shipped off the shelf.

Second Printing \$ 14.95

## 6800 FLEX™/SWTPC Software

### ● Renumbering System by Dave Degler

Renumber your BASIC programs with this new FLEX™ utility. You'll wish you had it if you paint yourself into programming "corners". Needs no extra RAM beyond the program being renumbered. With operation notes. Available on FLEX™ minifloppy disk or SWTPC KCS cassette.

### ● Some Common Basic Programs by Lon Poole and Mary Borchers

Now adapted to FLEX™ and SWTPC 8K BASICS! 67 key programs from the popular book, which is necessary as the manual. Conversion notes included.

Disk 1: 37 programs on finance, investments, mortgage amortization, plotting, integration, more.

Disk 2: 30 programs on matrix arithmetic, statistics, calendar dates, metrics, more.

Available on FLEX™ minifloppy disk or SWTPC 8K KCS cassettes. The book, Some Common Basic Programs — \$ 8.50

### ● Weekly Payroll / Income Expense Ledger / Club's Mailing List / Church Membership and Pledge Records by Roger L. Smith

These BASIC programs have had years of use and will be valuable additions to your SWTPC software library. Operation notes included. Cassette editions store data on data tapes. Each program is on one FLEX™ minifloppy disk or SWTPC 8K KCS cassette.

Prices: FLEX™ minifloppy disk \$ 16.95 each  
Kansas City Standard SWTPC 8K BASICS Cassette \$ 10.95 each

All software shipped off the shelf. Please include check or money order. International: add \$ 4.00 per item for air mail postage. U.S. First Class: add \$ 2.00.

## S S I Publications

4327 East Grove / Phoenix, Arizona 85040

\* Distributed to dealers by MICROMEDIA Marketing, 800-423-4265  
See us at the COMPUTER FAIRE, booth 423 in San Francisco, May 11-13  
FLEX™ is a trademark of Technical Systems Consultants, Inc.



## WPDaisy con't...

right margin is in an escape sequence, part of the screen may be blanked out and nothing can be written there until the stuck character is eliminated. On occasion, I have found it expedient to change the wording of the text slightly in order to clear up the problem and get on with the job. One technique which sometimes solves this type of problem is the "clear screen" command, which clears the screen and re-displays it directly from memory.

A somewhat annoying characteristic results when one word appears on the last line of a paragraph. When typing standard single-spaced para-

graphs, an extra line is included between them by means of two line feeds, a break and a line feed, or a skip line and line feed. The line feed is needed to indent the next paragraph, and to maintain a proper block count. When a single word is alone on the last line, WPDaisy skips an extra line. This has to do with the "break" which prevents the justification and hence inappropriate spacing of the last line of a paragraph. It can be corrected, but requires special attention.

When typing in edit mode past the right margin, if a word is not complete when the margin is reached the word flips to the next line, and the cursor does too, but the cursor goes to the beginning of the line rather than to the position where it was in the word. As a result, as typing continues it overprints and wipes out the word. This problem does not occur when in the bulk insert mode.

For some reason, the fill function closes up all words to only one space between words, and this prevails between sentences as well; it would be nice to have the extra space retained so two spaces could be used between sentences, or after a colon.

### Missing capabilities: footnotes, subscripts, overprints, etc.

Daisy lacks a few specific formatting functions. A footnote can be inserted, but to do so one must find where it goes by previewing, then insert the footnote itself or a statement to call it from disc or buffer at the proper point. Subscripts and superscripts are not possible in the current version (00.08), nor is it

possible to use 1½ spaces between lines. These latter two are unique as far as I can see in being the only things WPDaisy will not do at all, no matter how much trouble one is willing to go to. (Some printers support the 1½ line spacing, independently of WPDaisy.)

Overprinting such as might be used for construction of symbols or foreign letters has to be done with the negative line feed and an extra line, and generally a few tries to get it right. Also bold face and double strike (to make a better copy with cloth ribbon) are not available on the 00.08 version.

### Things I'd like to see

In addition to the items mentioned in the section above and trouble spots referred to earlier, I have made a few other wishes when using WPDaisy as to what I'd like to have it do. These I think are reasonable, and I have made these suggestions to TSA. I'm told some are already being prepared for introduction in future versions; some changes may be available as this goes to press (see below). Don't be misled by my problems into thinking TSA is not responsive. They have, in fact, been most helpful and patient with this novice.

The biggest help for me would be a more efficient way of moving back and forth through the text, in edit mode. Scrolling would be nice, but at least I'd like to have the text move up a line at a time when the cursor reaches the bottom of the screen. I'd like to have the shift screen command display the next screen (instead of moving 23 lines from the current

Table 2  
Partial listing of WPDaisy printout formatting statements

[ES] the "escape" character, used to set off formatting statements.  
[CR] carriage return.  
[LF] line feed.  
[FF] form feed; causes new page.

The following are used in the SAMPLE PRINTOUT.

MB bottom margin; -MB stops printer for new page to be inserted.  
ML left margin.  
MP paragraph indent.  
MD delayed indent; sets indent on lines after the first in a paragraph.  
PN page number for following page.  
PW page width.  
LN normal letter width; sets width in 60ths of an inch.  
LP proportional line spacing switch.  
C centering.  
U underlining.  
J justification.  
F filling.  
SP line spacing.  
SK skip lines.  
HA the text string following this becomes heading A (the first one).  
HB heading B (on the second line).

The above are preceded by a number which determines the value, or if the command is a switch turns it on (1) or off (0). Their use is demonstrated in the SAMPLE PRINTOUT. Additional statements cover top, heading and special margins, page length, the visible space, a non-specific "break," non-printing comments, and reading from a disc file.

### SAMPLE PRINTOUT

#### A bug which turned out not to be one

When I first set up my small system with the WPDaisy software I found it impossible to control the printout format. Indenting appeared spontaneously without apparent reason, and I could not seem to get it to work when I wanted it to.

The revelation came when I discovered that the Hazeltine 1500 has a switch which permits the user to select whether a line feed or a carriage return character is sent when the typing reaches the right edge of the screen. My terminal had been set on line feed!

When I switched to "carriage return" things began to look up. It was a happy day, and although this discovery did not clear up all my problems, it quite suddenly made the system seem like it might someday become controllable.

Note that the first paragraph is printed with the default values built into WPDaisy--filled and justified but not proportional. The type face used is that for 12-pitch or elite spacing; the spacing in the first paragraph is 10-pitch and the others are 12. The second paragraph is filled, justified and has proportional division of the spaces between words. The third is not justified, this one is.



cursor position), repeating the current bottom line at the top of the next screenload. When bulk text is inserted the cursor goes to the end of the insert, and this is placed at the top of the screen. I've learned that the frightfully blank screen is OK and the text is there—easily displayed by a shift top command—but I'd like to see the last line or two of inserted text. In fact, I would prefer the cursor to end up at the beginning of it, since I'm going to review it anyway. Even the command which takes the cursor to the end of the text could leave a line or two visible. I rarely have the confidence to start typing on a blank screen without backing up to see where I am. The shift top command should also redisplay the current line.

The find function puts the found string at the left margin and top of the screen, hence not in its context. Why not show the whole line, with the cursor on the found word? I'd like also to be able to use the find command in a backward direction, and to display in a list all lines containing found words. While finding things, I'd like to be able to count the number of items found, and though it is a different category of request, I'd like to be able (optionally) to number the lines.

### Changes coming up

I have been told by Rich Roth of TSA that a new version, due any day now, will incorporate some of the changes I have suggested and some others as well. These include sub and superscripting, fractionally variable line spacing (e.g., the ability to use 1½ spaces between lines), tab setting in format mode, ability to read the disc file directory without leaving WPDaisy, overstrike, bold face and double strike capabilities, and a simplification of some of the commands and formatting statements. There will also be editing and formatting macros, plus single character macros. This latter item will enable the user to define a single character as a format statement, such that whenever the character is used the statement is executed. For example, the brackets could be used to start and stop underlining.

A much more extensive text and data handling system based on the word processor is also in the works at TSA.

### Summary

Everything considered, I am quite pleased with the WPDaisy word processing program and the hardware I

run it on. It will do essentially anything I want it to do, though some things are less convenient than they could be. Things that are impossible in the version I have are sub and superscripts and proportional control of spacing between lines. Moving the text back and forth on the screen for editing is slow, and many of the commands are a bit cumbersome. There are occasional bugs in printout, but these seem to be a result of user technique as much as the program itself. The system has been operated independently (albeit at less than its full capability) by users with only a couple of hours of training.

I feel that I have been able to obtain a true word processor with most of the features of the dedicated ones at less than half the cost.

### Where to get WPDaisy

The WPDaisy and other TSA software can be obtained through most computer stores, or from TSA Software, Inc., 39 Williams Street, Monroe, CT 06468.

WPDaisy is also available from Dynabyte, Inc., 1005 Elwell Ct., Palo Alto CA 94303, and includes a self-teaching program for learning how to use and apply the system. \$350. □

## The Malibu 165 Printer—just plain hard to beat!

The Model 165 dot matrix printer provides an unbeatable combination of features to meet the business user's requirements.

**SPEED:** Throughput is maximized at 165 characters per second with smart bi-directional printing and programmable horizontal and vertical tabs.

**VERSATILITY:** Two standard character sets satisfy different business needs: a high speed font for report printing; and an alternate, reduced speed, high density font which approaches "word processing quality"

for correspondence printing. Each character set features upper and lower case with descenders, expanded characters and underlining.

Different forms sizes are a breeze with 3" to 15" adjustable tractor feed and easy user-adjustable platen to accommodate multi-part forms.

**GRAPHICS:** Software control of the printer allows un-



limited graphics capabilities (8280 dots/sq. inch resolution) from plotting to user-generated foreign or scientific character sets.

**RELIABILITY:** The proven LSI Hydra Ballistic™ print-head goes on printing after the others have quit.

Ribbon changing is minimized with the continuous re-inking, automatic reversing nylon ribbon.

Modular electronics and assemblies reduce down-time if service is ever required.

**SILENT SAVINGS:** Our "power miser" circuitry eliminates a major cause of office equipment noise irritation. Seconds after printing stops the fan and ribbon motors stop and remain silently vigilant, reactivating as soon as new characters are received. It not only saves your nerves, it saves energy too.

For more plain facts or a fancy demo—see us in booth 1000, 4th Computer Faire, May 11, 12 & 13, San Francisco; ask your computer dealer, or contact:  
Dealer inquiries invited.

**malibu** Design Group, Inc.

(213) 998-7694

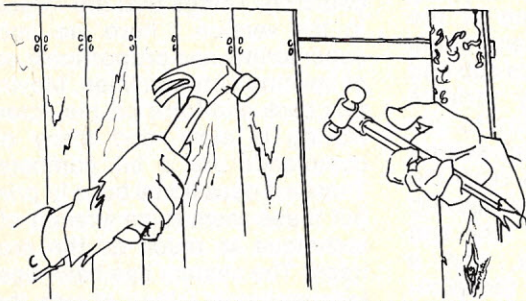
8900 Eton Avenue Suite G, Canoga Park, CA 91304

CIRCLE 171 ON READER SERVICE CARD



## IDSWORD\* WORD PROCESSOR

*the right tool for a better job*



FOR MORE INFORMATION, CONTACT DISTRIBUTORS BELOW OR VISIT YOUR LOCAL SOFTWARE DEALER (AND TAKE ALONG THIS AD). DEALER INQUIRIES INVITED.

IDSWORD VERSION	CIRCLE	DISTRIBUTOR
ALTAIR	216	INTERACTIVE DATA SYSTEMS, INC. PO BOX 290, OWINGS MILLS, MD 21117 TEL. (301) 486-6945
NORTH STAR MBASIC -> CP/M CBASIC -> CP/M APPLE II	217	CW APPLICATIONS 1776 PLAZA, 1776 EAST JEFFERSON STREET ROCKVILLE, MD 20852 TEL. (301) 468-0455
ALPHA MICRO AM-100	218	THE COMPUTER WORKSHOP OF MD, VA., INC. 5240 PORT ROYAL RD, SPRINGFIELD, VA 22151 TEL. (703) 321-9047
INTEL MDS/SER 2	219	TAU SIGMA CONSULTANTS, INC. 6420 FLYING CLOUD DR, EDEN PRAIRIE, MN 55344 TEL. (612) 944-7354
CROMENCO	220	RGA ENTERPRISES, INC. c/o BYTE SHOP 6341 ALBEMARLE RD, CHARLOTTE, NC 28212 TEL. (704) 568-8100
TRS-80 TECHNICO	221	RADIO RANCH, INC. RADIO RANCH AIRPORT - RT 3, POLO, IL 61064 TEL. (815) 946-2371
OPUS	222	BUSINESS MICROSYSTEMS 7225 WEST RENO RT 5, OKLAHOMA CITY, OK 73108 TEL. (405) 787-3020
UCSD PASCAL	223	COMPUTER CONSULTANTS OF AMERICA, INC. PO BOX 87, RATESVILLE, MS 38606 TEL. (601) 563-4594



**INTERACTIVE DATA SYSTEMS**  
SOFTWARE CONSULTANTS

P.O. BOX 290, OWINGS MILLS, MD. 21117

## HOW TO BUY A BUSINESS COMPUTER

WHEN TO BUY • WHEN NOT TO BUY •  
HOW TO CHOOSE CONSULTANTS • DATA  
GATHERING • PACKAGED VS CUSTOM  
SOFTWARE • CONTRACTS • FINANCING  
• WARRANTIES AND MAINTENANCE • INSTALLATION  
MANAGEMENT AND MUCH MORE . . . .

"SUPER BOOK!" DP Consultant, Mercer Island, Washington.  
"I wish I'd had this book before I bought my computer!" TV  
Station General Manager, California.

"It's the best book I've seen on the subject. Send me 5 copies  
to send to my clients." CPA, Orange County, California.

"I really learned something from this book and I'm in the  
business. I'm recommending it to my clients." DP Consultant,  
Alhambra, California.

Here's a straight forward approach to business computer  
purchase and installation. It will save you time and money.

**ORDER NOW!** If not completely satisfied, return within 30  
days for a full and immediate refund.

8 1/2 x 11 Softbound ■ 178 pp. ■ \$12.95  
Credit Card Orders 1-805-964-7448

### DDC PUBLICATIONS

5386 Hollister Ave., Santa Barbara, CA 93111

Rush \_\_\_ copies of "Winning The Computer Game" at \$12.95  
per copy. (CA residents add 6% sales tax)

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY/STATE/ZIP \_\_\_\_\_

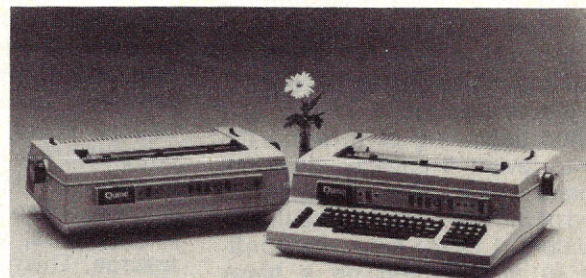
☐ Check ☐ MasterCard ☐ Visa

Card No. \_\_\_\_\_ Exp. Date \_\_\_\_\_



## IBM Buys Qume. Now You Can Too!

### The Qume Sprint 5 Daisywheel Terminal.



**FAST.** At 55 characters per second the fastest daisywheel printer made.

**SMART.** The Qume Sprint 5 is the printer for word processing and plotting because microprocessor controlled Sprint 5 logic responds to all 128 ASCII codes plus 43 Qume-defined commands for specific paper handling and carriage movement controls. That means it supports bidirectional printing, proportional spacing, right justification and high resolution graphics (5760 points per square inch).

**FLEXIBLE.** A variety of configurations guarantees there is a Sprint 5 for you, whether you have a TRS-80, an IBM 370 or anything inbetween.

- Keyboard (KSR) or Receive Only (RO)
- RS-232C, DC Current Loop or Parallel Interface
- 45 or 55 characters per second

A multitude of daisywheels (over 70) in various typestyles, pitches and language variations plus a colorful rainbow of carbon and fabric ribbons gives you a dynamic range in the appearance of your letter perfect printouts.

### Reconditioned Qume-based Daisywheel Terminal was \$4500+, now \$2150.



Gen Com's 300Q Qume Terminal, fully  
reconditioned

- Qume Q30 print mechanism (30 cps)
- Bidirectional printing/proportional  
spacing
- Plotting—Super Plot firmware package  
standard
- 1/120" horizontal control, 1/48" vertical  
control
- Wheeled pedestal standard
- 86 key keyboard w/15 key numeric pad
- RS-232C serial interface, cable included
- ASCII encoded w/256 character buffer
- 30 day limited warranty
- Nationwide service

Qume Sprint 5	55 CPS, KSR	\$3295
	45 CPS, KSR	2995
	55 CPS, RO	2895
	45 CPS, RO	2695

Gen Com 300Q	2150
DTC 300A (similar to Gen Com 300Q, but w/Hytype I mechanism)	1995
Forms Tractor	210
Pin Feed Platen	160
TRS-80 interface (for any above terminal)	39.95
Electric Pencil Word Processing Software (TRS-80 version)	99.95
Daisywheels and Ribbons (Qume and Diablo)	write for list

TAX and SHIPPING (FOB San Leandro, CA), if applicable, not included

write or call

### COMPUTER TEXTile

10960 Wilshire Blvd., Suite 1504

Los Angeles, CA 90024

(213)477-2196

Dealer  
Inquiries

Data Wholesale Corporation  
700 Whitney Street  
San Leandro, CA 94577  
(415) 638-1206

Leasing  
Information

Data Capital Company  
700 Whitney Street  
San Leandro, CA 94577  
(415) 638-1206





# IDSWORD — The Comprehensive Processing System for Home and Business

**Victor K. Heyman**

Victor K. Heyman, 1706 Lorre Dr., Rockville, MD 20852.

IDSWORD was created two years ago for the MITS Altair System. It has been franchised to a number of distributors who are converting it to different computer systems. Versions exist for North Star, Alpha Micro AM 100, Cromemco, Technico, TRS-80 (disk), Apple II (disk), CP/M 5" and 8" disks in either CBASIC or MICROSOFT basic, and, of course, MITS. Versions for OPUS and PASCAL are in the offing.

If you carefully read advertisements for word processors and articles about them, you will suddenly realize that you are told little about their capabilities or requirements. How much memory does Brand X take? How will it work with your disk system. Can it produce finished copy in single, double, or triple space? Does it permit movement of blocks of text from front to back or in between? How about changing the number of characters per line (reformatting)? Do you need to retain redundant word processing files, or can you convert to a standard data file at half the file space (and convert back later if need be)? Does it do form letters, print labels, and prepare name and address files?

This review discusses the IDSWORD system in detail, based on the North Star Version (each version varies a little). Hopefully, you will have something of a yardstick for comparing it to other systems on the market.

## IDSWORD Modules

IDSWORD is a big system. At the moment it consists of 7 separate major modules, some with sub-modules, plus (in my version) North Star Basic, DOS, Monitor and Compactor. The North Star items enable you to turn on the computer and come

up directly in IDSWORD. Since all the modules are "chained" you are rarely aware of which module you are in, so you don't have to worry about remembering a lot of code names. Now, let's look at the major chunks of the system (the prices for the various modules are listed in Table 1).

## Minimum System

IDSWRD.....	\$100.00
IDSEDL.....	25.00
IDSEDC.....	50.00
IDSEDCG.....	30.00
IDSCOP.....	15.00
IDSMOV.....	35.00
IDSLET.....	30.00
IDSNAM.....	20.00
Total \$305.00	

Table 1. IDSWORD modules and prices.

## Basic Modules

IDSWORD is the text-entering, listing, and printing system (i.e., the heart of the system). IDSEDC is the editing module for CRT's, and is essential to getting the maximum out of the system. Thus you can have all of the essentials for \$150.

But, there is more. Want to do line editing, after listing out your text? It is a simple and quick way to do minor editing. IDSEDL does it and you could get by with this package and not the CRT editor but I wouldn't recommend going that route. Nevertheless, the option is there, and you would have a useable package for \$125.

How about "global" editing? IDSEDCG allows you to easily correct a misspelled word throughout the text. Quite handy if you make a point of being consistent in your misspelling of words. For example, if you misspelled "computer" in several places within a paper IDSEDCG will search the

text and replace every misspelling with the correct spelling (the command is "RA, compter, computer").

Want to save disk space when you store old files? With IDSCOP you will be able to copy regular files to word processing format and back again. I've used it for every report, letter and mailing list I've done. I don't have many disks tied up storing materials, and I can still reuse those files later. (On the MITS version COP will allow you to use IDSWORD on Basic programs.)

IDSMOV will allow you to move text from one place to another, or even to copy it into two places. Remember the old adage: stream-of-consciousness writing makes lousy reading? With MOV you can move that brilliant passage to the place that it logically belongs. The system simply creates a temporary disk file for the text to be moved or copied, puts it where you want it in the main file, and then destroys itself. Neat.

## Other Features

IDSLET and IDSNAM are the modules that let you create personalized form letters and name and address files. I've used them for sending out job applications for my oldest two boys. The NAM module is used for labels and also supplies the proper headings for the form letters. And you can use the "special comments" lines in NAM for inserts into the letters produced by LET.

## The Bottom Line

The cost of the whole system is \$305. If that seems high, it should be kept in mind that IDSWORD is a dynamic creation. The system is not going to become obsolete. For instance, a sort module for NAM is almost here, as is a data base



### Ease of Use

Even so, there are many features of the system that can be used better with a little instruction. The manual for the IDSWORD system is very readable and quite comprehensive. In less than 40 pages it tells you how to use the system and gives tips on alternative approaches. Nicely done.

What happens when you make a mistake — a big one? Can you bomb your whole text file? Not without really working at it, in my experience. In the first place, the Horizon version has excellent error trapping features (including trapping attempted exits through 'Control C'). This maintains program integrity very well. In the second place, when you have filled a file, the program closes it automatically, and then permits you to set up another file, which you can later merge with the first. In the third place, the existence of two text files permits you to cancel all the changes you may have made erroneously by simply commanding "RESTORE". No, despite my best efforts, I have not completely bombed a file since I got **IDSWORD**.

## Not All Clover

Nothing is perfect. There are IDS-WORD features you may not like (based on my experience with the North Star version.)

NAME OF WORD PROCESSING FILE: IDREV  
DRIVE: 2  
'IDREV@' FILE OPERATION (TYPE 'HELP' FOR ASSISTANCE) HELP

```

SPECIFY OPERATION AS FOLLOWS :
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
OPERATION      DESCRIPTION OF FUNCTION
=====
COP      COPY AN EXISTING FILE TO SYSTEM FILE.
DEL      DELETE FILE
EDC      LINE EDITING ON THE CRT.
EDG      EDITING - GLOBAL.
EDL      EDITING - LINE BY LINE.
LET      PRINT FORM LETTER FROM NAME & ADDRESS FILE.
LIS      LIST THE CONTENTS OF THE FILE.
MER      MERGE TWO OR MORE FILES TO A NEW FILE.
MOV      MOVE OR DELETE BLOCKS OF DATA.
NAM      ENTER NAME & ADDRESS DATA.  CREATE OR ADD TO A FILE.
NEX      NEXT W/P FILE - ENDS WORK WITH CURRENT FILE.
PRI      PRINT DATA IN FINISHED FORM.
REF      REFORMAT DATA.
RES      RESTORE FILE TO ELIMINATE LAST CHANGE.
TEX      ENTER TEXT DATA.  ESTABLISH OR ADD TO A FILE.
XIT      EXIT FROM THE PROGRAM - ALL WORK IS DONE.
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

'IDREV0' FILE OPERATION (TYPE 'HELP' FOR ASSISTANCE) XIT

```

IDSWORD ENDED. GOODBYE.  
READY

Figure 1. Menu from IDSWORD.

much, and let the reformatting module even up the lines when you are done.

Second, when entering text you do have to wait about every five lines to update disk memory and come up with the next numbered line for you to type on. If you are composing on the Keyboard, that's not much of a problem. But if you are a madman typing a long manuscript at top speed, the delay is definitely noticeable. This is not a problem on the MITS version.

Third, the IDSWORD does indeed run in 32K memory, but editing in the CRT mode with EDC is rather slow. You only have about 32 lines in memory at any one time, and the program has to pull a line at a time from your disk file as you scroll through your text. An extra 8K memory is awfully useful, giving about 130 lines in memory, about the length of this article.

Fourth, the NAM module for name and address files is awkward to edit in its present configuration. Each entry is assigned 15 lines, 5 for name and address and the rest for telephone numbers and special comments. Each entry must remain 15 lines! To edit a 60 name file on EDC, you have to go through 900 lines of text, which is a bore. The IDSWORD people tell me they have a new approach in the works to make the editing operation faster. Good.

text. I don't know that any system will, or that the printer would be willing if the text system permitted, but it would be nice.

## Summary

**IDSWORD** is a fine word processing system. It is simple to use and a pleasure besides. It costs \$125 for the minimal version and about \$305 for the complete package. It works well on a 32K computer, better with 40K, and it does not need a video board, CP/M, or a version of basic different from that standard for your computer. It is an evolving system that is extremely versatile. It can be expected to improve with age and use.

Having used it for a month on my Horizon, I wouldn't consider giving up IDSWORD. Definitely recommended.



*"Eight counts of computer fraud — that's why you're here!"*

©Creative Computing





# IF YOU OWN A TRS 80 \* . . . . .

TRS-80 is a product of Radio Shack, A Tandy Corporation

## **SELECTRA-PRINT** PUTS YOU JUST A CABLE LENGTH AWAY FROM A "HARD—COPY" ( Typewriter Quality: clean, clear, high-fidelity ) Word Processing System!

... just a simple hook-up with the supplied cables and your **SELECTRA-PRINT** is ready to run.

For Word Processing on a TRS-80, for example, just command "LPRINT" and **SELECTRA-PRINT** automatically outputs clear, clean, high-fidelity, hard copy. . . . and of course you can use it to print-out any other information you might need.

### SPECIAL NOTE:

**SELECTRA-PRINT** is a Selectric II typewriter and although it has been modified for computer print-out, it may still be used as a standard office typewriter.

PRICE: \$1,850.00\* \*TRS-80 Version \$1925.00

### OPTIONS:

Dual Pitch	\$125.00
Correction Feature	\$125.00
Noise Reduction Feature	\$50.00
RS-232 Interface	\$195.00

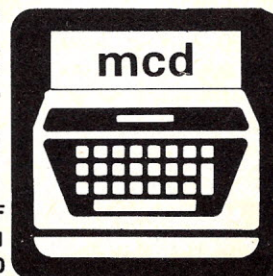
Direct International Sales:  
International Sales Division  
17648 Orna Drive  
Granada Hills, CA 91344, USA

Discounts Available to  
EDUCATIONAL ACCOUNTS  
Dept. No. CC 1-74 PO Box 8394  
Ann Arbor, MI 48105 (313) 665-8514

**\* SELECTRA-PRINT is VERSATILE!**  
**SELECTRA-PRINT** is compatible with most micro- and mini-computers including **PET • Apple • Heath H8 • IMSAI • Cromemco • Alpha Microsystems • Space Byte • North Star Horizon • SWTP • Vector Graphic • Sol • Polymorphic • Digital Group • Ohio Scientific • Altair • Sorcerer Xitan • Rex • KIM • EXORcisor . . .**

*"From now on, PRINT-OUT takes on a new meaning"*

M30  
micro  
computer  
devices  
inc.



960 E. Orangethorpe, Bldg. F  
Anaheim, California 92801  
Telephone (714) 992-2270

*"Innovators to the Microcomputer Industry"*





## Peripherals Unlimited Text Editor

Jim Hunter

*Two products, one hardware and one software, can provide passage into your new world of upper and lower case word processing.*

When choosing a microcomputer, many people have shied away from the Apple II due to its lack of lower case ability. This is no longer a problem. As fate would have it, I was almost simultaneously introduced to the Dan Paymar lower case adapter for the Apple and the Peripherals Unlimited Text Editor. Since the Text Editor supports lower case as well, the two seemed a likely method of achieving finished copy with my Apple. The finished product is made by using a Selecterm printer, and the results have been quite satisfactory. This review will point out the benefits and drawbacks of both of these software items.

### Paymar Lower Case Adapter

The Paymar adapter plugs into the Apple mother board under the keyboard. The main criticism I have about the unit rests here. The advertising says that it will install easily on the Apple. My experience was to the contrary. It was necessary to exert more force on the keyboard than I care to admit in order to place the IC 'shelf' (adapter) into its prescribed position. You are also required to place a second smaller IC into an adapter base, but this smaller unit poses no problems. Once installed, however, the unit has proven most worthwhile. There is a software package included with the Lower Case device, which uses control characters for shifting. Not having worked extensively with this software I would hesitate to demean it, but I find that the technique adopted by Peripherals Unlimited (using the escape key) is

superior for touch typing.

The lower case adapter from Paymar lists for \$49.95, and is available from your local computer store, or contact:

Dan Paymar, P.O. Box A-133, C.S. 6800, Costa Mesa, CA 92627. For a finished copy application used with a 96 character printer, this device is a must for Apple II owners, who want to see on their CRT what is going to their printer.

### Peripherals Unlimited Text Editor

Now that I had a lower case on my Apple, I began the search for a text editor which would make use of it. As luck would have it, I came across just such a unit within a very few days. Peripherals Unlimited, of Lakewood, CA, has a Text Editor which serves quite well, with a few limitations. First off, Text Editor is a general term, and brings to mind tools for "word processing." In this regard, the Text Editor must be termed a "line processor," since in most instances, correction of a single word is done by recopying a whole line of text. It should, however, be noted that Peripherals Unlimited does not claim to be a word processing unit, but rather a Text Editor. To this extent, they are quite accurate.

The program allows the writer to:

1. Append or insert text from the disk.
2. Correct a line.
3. Delete a line.
4. Find all occurrences of a string.
5. Print (with or without justification).
6. Display text with line numbers.
7. Display memory remaining.
8. Replace all occurrences of a string.

9. Save all or part of text to disk.
10. Set or clear tabs.
11. Center a line.
12. Perform other utility functions dealing with text handling.

When making output to a printer, you are asked about top and bottom margins, left margin, justification, spacing, and the nature of the forms used. It is a pity, but none of these queries has a default value, and thus they must all be set with each printout.

There is also an automatic page numbering feature which is useful, although it sometimes prints the numbers past your right margin. Two final observations in criticism: first, the string handling routines have a habit of getting behind a touch typist once in a while; and, the operator must wait for the machine to catch up. Finally, the justification algorithm is such that more spaces are allocated at the beginning of a line than at the end, although I am assured by Peripherals Unlimited that this will be corrected in short order with their next release.

In summary, then, the package does have its short-comings; however, if you can live with them, the editor is a great way to achieve finished copy with upper and lower case—especially when coupled with the Paymar device. The Text Editor sells for \$60, and can be found locally, or contact:

Peripherals Unlimited, 6012 Woodward Rd., Lakewood, CA 90713, 213-425-8752.

The documentation is good, and you can be quickly on your way to producing finished copy with your Apple. □

Jim Hunter, Byte Shop of Westminster, 14300 Beach Blvd., Westminster, CA 92683.



# TRS-80 OWNERS

## AVAILABLE FOR IMMEDIATE DELIVERY

### CASSETTE

### SOFTWARE

### DISKETTE

Package # 1036 (Level II) .....\$495.00

COMPLETE SMALL BUSINESS – This program is a complete small business program that was tailored to work for most small business applications. The program includes such things as Accounts Receivable, Accounts Payable, Invoicing, Inventory Control, Payroll and General Ledger.

Package # 1038 (Level II) .....\$ 99.95  
ACCOUNTS RECEIVABLE

Package # 1039 (Level II) .....\$ 99.95  
ACCOUNTS PAYABLE

Package # 1044 (Level II) .....\$125.00  
INVENTORY CONTROL

Package # 1045 (Level II) .....\$ 99.95  
INVOICING

Package # 1046 (Level II) .....\$ 99.95  
PAYROLL

Package # 1047 (Level II) .....\$ 99.95  
MAILING LIST

Package # 1024  
(Level II, DISKETTE) .....\$24.95  
Includes the following:  
SPACEWAR I – BANNER – UFO ATTACK – PILE UP –  
BIORHYTHM – AUTO RACE and WORDS.

Package # 1026  
(Level II, DISKETTE) .....\$24.95  
Includes the following:  
SPACEWAR II – CIVIL WAR – TRAP THE TRIBBLE –  
LIFE – KNIGHT – CONCENTRATION and LUNAR  
LANDER.

### OVER 150 EXCITING PROGRAMS

### ★ MORE EVERY DAY ★

### EDUCATION

### ELECTRONICS

### MARKETING

Also available for PET and APPLE.

All SOFTWARE-80 programs are guaranteed.

Programs available in Level I and Level II Basic.

All of our business programs will operate with printer; custom programs also available.

With certified check or money order, all orders shipped within 24 hours.

Personal checks allow 2 weeks.

Send for our complete catalogue.

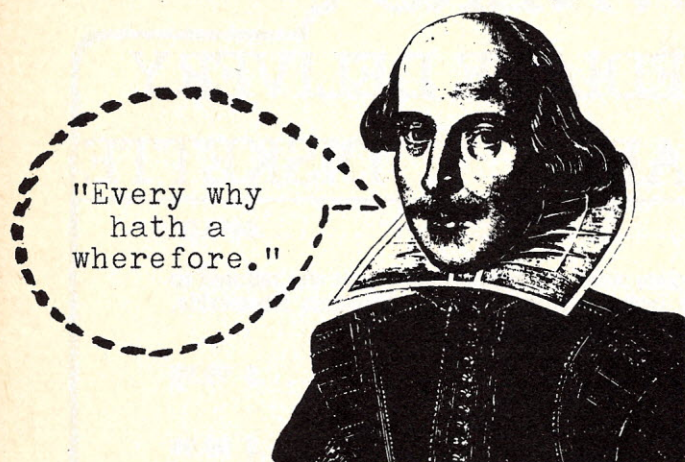
## SOFTWARE-80

18228 Cabrillo Court  
Fountain Valley, CA 92708

ALL PRICES AND PROGRAMS ARE SUBJECT TO CHANGE WITHOUT NOTICE



# creative computing book service



## Education & Self Learning

### Using BASIC in the Classroom

**Donald D. Spencer.** A teacher's guide that makes every phase of teaching computer programming more productive and enjoyable. It gives you fresh but proven ideas for presenting computer and programming topics, scheduling terminal time, purchasing a microcomputer or minicomputer, running the secondary school instructional computer facility, and giving assignments that arouse enthusiasm in your students. 224 pp. \$8.95 [10E]

### Be A Computer Literate

**Marion Ball & Sylvia Chorp.** This introductory book is extensively illustrated with full-color drawings, diagrams, and photos. Takes the reader through kinds of computers, how they work, input/output, and writing a simple program in BASIC. Aimed at ages 10-14 but beginners of all ages will find it informative. 62 pp. \$3.95. [6H]

### Problem Solving With The Computer

**Ted Sage.** Used in conjunction with the traditional high school math curriculum, this book stresses problem analysis in algebra and geometry. This is the most widely adopted text in computer mathematics. 244 pp. \$7.95 [8J].

### Sixty Challenging Problems with BASIC Solution

**Donald Spencer.** This book is a vehicle for computer programmers to measure their skills against some interesting problems that lend themselves to computer solution. It includes games, puzzles, mathematical recreations and science and business problems—some hard, some easy. The book will complement any computer-oriented course in secondary school or college. BASIC program solutions included. 80 pp. \$6.95 [9W].

### The Calculus With Analytic Geometry Handbook

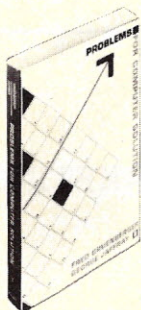
**Jason Taylor.** Ideal for a HS or college introductory calculus course or for self-learning. Five chapters include: analytic geometry; functions and derivatives; integration techniques; vectors and functions of more than one variable; and sequences and series. Widely acclaimed by educators, this book is fast becoming the *standard calculus reference text*. Handy reference for scientists, engineers, and mathematicians too. Large format, 68 pp. \$2.95 [7Q].

### Problems For Computer Solution

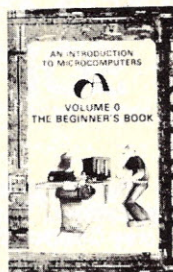
**Gruenberg & Jaffray.** A collection of 92 problems in engineering, business, social science and mathematics. The problems are presented in depth and cover a wide range of difficulty. Oriented to Fortran but good for any language. A classic. 401 pp. \$10.50 [7A].

### Problems For Computer Solution

**Steve Rogowski.** The Student Edition is designed to encourage research and preliminary investigation on the part of the student. The problems are ordered by subject and can be expanded or shortened. Mathematical problems that have never been solved are also posed to challenge and sharpen the student's awareness. 98 pp. \$3.95 [9Z]. Also available is the Teacher's Edition which contains solutions, programs and analysis of the problems. 271 pp. \$9.95 [9Y]. Both books are highly recommended for any high school or college computer-oriented course.



## Getting Started



### An Introduction to Microcomputers, Vol 0 - The Beginners Book

**Adam Osborne.** Parts of a computer and a complete system; binary, octal and hexadecimal number systems; computer logic; addressing and other terminology are discussed in a language the absolute beginner can understand. Hundreds of illustrations and photographs. 220 pp. \$7.95 [9T]

### An Introduction to Microcomputers, Vol 1 - Basic Concepts

**Adam Osborne.** Thoroughly explains hardware and programming concepts common to all microprocessors: memory organization, instruction execution, interrupts, I/O, instruction sets and assembly programming. One of the best selling computer texts worldwide. 350 pp. \$8.50 [9K]

### Vol 2 - Some Real Microprocessors. Vol 3 - Real Support Devices

**Adam Osborne.** These volumes complement Volume 1. Vol. 2 discusses the operation of each of the following MPUS in detail: F8, SC/MP, 8080A, Z80, 6800, PPS-8, 2650, COS MAC, 9002, 6100 and seven others. Also information on selecting a micro. Vol. 3 discusses various support and I/O chips. 895 pp. \$20.00 each. [9L] [10Q]

### Beginner's Guide To Microprocessors

**Charles M. Gilmore.** No background in electronics is necessary to understand this book. It was written for those with no prior knowledge whatsoever of microprocessors or personal computing. Gilmore takes you from what a microprocessor is, how it works and what it's used for to how they're programmed to perform desired functions in microwave ovens, TV games, calculators, etc. 175 pp. \$5.95 [7U].



### Microprocessors: From Chips to Systems

**Rodnay Zaks.** A complete and detailed introduction to microprocessors and microcomputer systems. Some of the topics presented are: a comparative evaluation of all major microprocessors, a journey inside a microprocessor chip, how to assemble a system, applications, interfacing (including the S-100 bus) and programming and system development. 416 pp. \$9.95 [10S]

### The First Book of Microcomputers

**Robert Moody.** Tells what personal computers are and what you can do with them in a light entertaining style. Starts with the basics and then covers the technical aspects such as how a personal computer is constructed and how it works. Includes such things as home protection, keeping track of budgets and bills, game playing, inventory management and tax calculations. 139 pp. \$4.95 [10T]

### Consumers Guide to Personal Computing and Microcomputers

**Freiberger and Chew.** Here are two valuable books in one: an introduction to the principles of microcomputers that assumes no previous knowledge on the reader's part, and a review of 64 microcomputer products from over 50 manufacturers. Also, extensive illustrations and best-buy tips for each type of microcomputer product. 176 pp. \$7.95 [10U]

### Getting Involved With Your Own Computer A Guide for Beginners

Leslie Solomon and Stanley Viet

### Getting Involved With Your Own Computer

**Solomon and Viet.** One of the first books on microcomputers that requires no previous knowledge of electronics or computer programming. Tells you where to find information, explains basic concepts and summarizes existing systems. Good place for the neophyte to begin. 216 pp. \$5.95 [9N].

### The Underground Buying Guide

**Dennis A. King.** The Guide is written for hams, CBers, experimenters, and computer hobbyists. It lists a wide range of parts, supplies, and services categorized by firms, products, and geographic location and is completely cross-referenced. Covers 250 product categories and 650 firms from tiny to huge. 200 pp. \$5.95 [7K].



## Learn With Computer Games

### Basic Computer Games

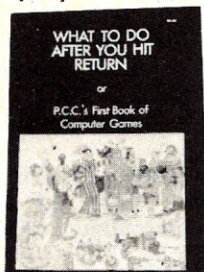
**David Ahl.** Here are 101 classic games all in Microsoft Basic for your TRS-80, PET, Apple, Sorcerer, etc. Every one is complete with large legible listing, sample run, and descriptive notes. Has all the best games: Super Star Trek, Football, Blackjack, Lunar Lander, Tic Tac Toe, Nim, Life, Basketball, Boxing, Golf, Hockey, Craps, Roulette, Awari, Bagels, Mastermind, Hammurabi, Fur Trader, Splat and many, many more. Now in its 5th printing. 200 pp. \$7.50. [6C]

### Game Playing with BASIC

**Donald D. Spencer.** Enjoy the challenge of competition with your personal computer. Amuse yourself with such computer games and puzzles as 3-D Tic-Tac-Toe, Roulette, Baccarat, and more. Includes rules of each game, how each game works, illustrations and the output produced by each program. The last chapter contains 26 games for reader solution. 176 pp. \$7.95 [10D]

### Chess and Computers

**David Levy.** This book is loaded with chess games—computer versus computer and computer versus human. Settle down with this book, set up your chess board, and play the games. As with any good chess book, half the enjoyment is found in playing along, duplicating the moves and reading the authors comments. 145 pp. \$8.95 [10C]

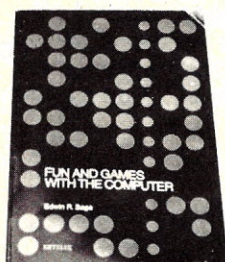


### What to Do After You Hit Return

Another collection of games and simulations—all in BASIC—including number guessing games, word games, hide-and-seek games, pattern games, board games, business and social science simulations and science fiction games. Large format. 158 pp. \$8.00 [8A].

### Fun With Computers and Basic

**Donald D. Spencer.** Mathematical recreations and games are an excellent medium for teaching computer programming. The reader learns the BASIC programming language during the process of learning to program fun type problems. The book introduces the reader to flowcharting, and the BASIC programming language. Includes many BASIC programs, cartoons, and drawings. Written specifically for use by junior high school students. 96 pp. \$5.95 [10F]



### Fun & Games With the Computer

**Ted Sage.** "This book is designed as a text for a one-semester course in computer programming using the BASIC language. The programs used as illustrations and exercises are games rather than mathematical algorithms, in order to make the book appealing and accessible to more students. The text is well written, with many excellent sample programs. Highly recommended."—*The Mathematics Teacher*. 351 pp. \$7.95 [8B].

### Game Playing With Computers (Revised 2nd Edition)

**Donald D. Spencer.** Now you can sharpen programming skills through a relaxed and radically different approach. Including 70 games, puzzles, and mathematical recreations for a digital computer. It's fully illustrated and includes more than 25 game-playing programs in FORTRAN or BASIC, complete with descriptions, flowcharts, and output. Brand-new "how to" information for applying mathematical concepts to game playing with a computer. 320 pp. \$16.95 [10G]

## Other Games & Activities

### The Way To Play

The newest, most comprehensive encyclopedia of games in the world. Complete rules for over 2000 games and indoor pastimes including race board games, strategic board games, tile games, card games, solitaire games, dice games, table games, casino and gambling games, games of chance and many more. Over 5000 drawings and diagrams in color. The perfect sourcebook for the computer game author. 320 pp. \$7.95 [10H]

### The I Hate Mathematics Book

**Marilyn Burns.** This book is for nonbelievers of all ages, but especially for kids who are convinced that mathematics is (1) impossible, (2) only for smart kids, and (3) no fun anyhow. This book shows that mathematics is nothing more (nor less) than a way of looking at the world and is not to be confused with arithmetic. In this book you'll find several hundred mathematical events, gags, magic tricks, and experiments to prove it. 128 pp. \$3.95 [11F]

### Toybook

**Steven Caney.** "More than 50 toys and projects have been chosen with imagination and care to provide a high ratio of satisfaction and fun in return for effort invested."—*Parents' Magazine*. It is "...a must for kids and anybody else interested in conjuring up delightful playthings out of odds and ends and scraps of stuff around the house."—*Whole Earth Epilog*. Packed with illustrations, photos, and step-by-step instructions. 176 pp. \$3.95 [10J]

### Star Games

**Razzi, Brightfield and Looney.** For *Star Trek* and *Star Wars* fans, here's a book that invites you to "join the Space Force for the greatest galactic battle of your life!" A game book, not a puzzle book, it challenges you to crack space-age binary codes and help your friends escape from the krakon's clutches. \$6.95. [10K]



### Cross-Sums

**Maltby & Fulbrook.** The answers are numbers! Vertical columns must total the same as horizontal rows. It's a new puzzle game—constructed by Richard Maltby, Jr., master puzzlemaker for *Harper's* and *New York Magazines*. 30 puzzles including Nursery Rhymes, Children's Hour, Golf, Movies, Famous Dates, and more. 108 pp. \$1.95 [10L]

### Geometric Cross-Sums

**Maltby & Fulbrook.** Another puzzle game. This one has 30 puzzles ranging in difficulty from easy to fiendish. Each diagram takes a special shape—Triangles Fun, The Magic Hexagon, Shapes Within Shapes, Literature in 3-D., and more! 108 pp. \$1.95 [10M]

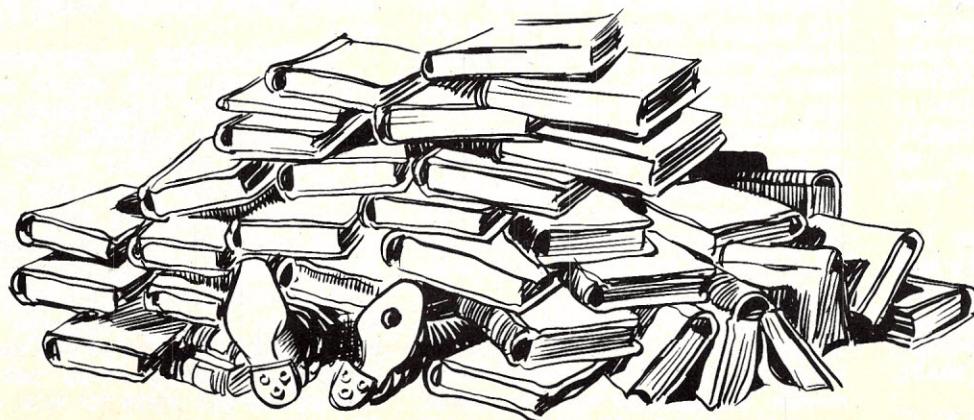
## Art and Music

### Artist and Computer

**Ruth Leavitt.** This unique art book covers a multitude of computer uses and the very latest techniques in computer-generated art. In its pages, 35 artists explain how the computer can be programmed either to actualize the artist's concept (such as the visualization of fabric before it is woven) or to produce finished pieces. Over 160 examples, some in full color. 122 pp. \$4.95 softbound [6D], \$10.00 hardbound. [6E]

### The Technology of Computer Music

**Max Matthews.** If you're interested in creating music on your micro-computer, here is an excellent source book written by the "Father of Computer Music." Includes fundamentals of digital sound generation, including the sampling theorem, digital to analog converters, analog to digital converters, filtering and storage of musical data. Also, a description of MUSIC V, a high level music language. \$16 hardcover [10N]

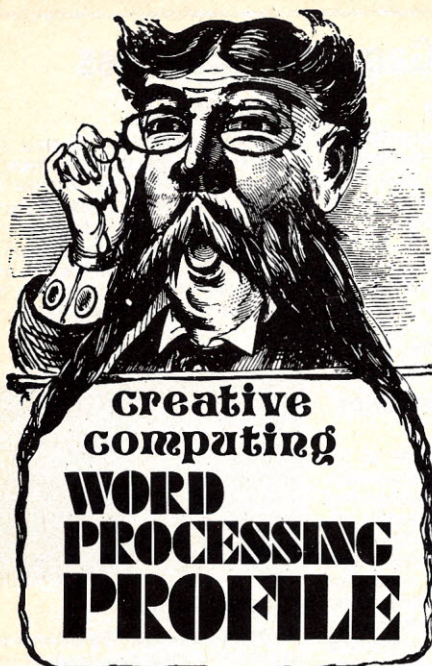


### To Order

Use the bound-in order form or send your check for books plus \$2.00 shipping and handling per order (Foreign: \$1.25 per book) to Creative Computing, P.O. Box 789-M, Morristown, NJ 07960. NJ residents add 5% sales tax. Visa or MasterCard are acceptable also. For faster service, call in your bank card order toll free to:

**800-631-8112**  
(in NJ call 201 540-0445)





WORDMASTER is a comprehensive text editor written and sold by Micro-Pro International Corporation, Suite 400, 1299 Fourth Street, San Rafael, California 94901. A similar version called NED (for New Editor?) is distributed by IMSAI with their Version 2.05 IMDOS derivative of CP/M.

IMSAI's naming of their version is more than just a clever designation for a new editor program. WORDMASTER/NED is an amplification and expansion of the ED editor supplied with CP/M. In many ways, WORDMASTER directly addresses the shortcomings of ED and greatly increases editing flexibility and ease while retaining much of the basic approach and structure of an editor familiar to many microcomputers.

WORDMASTER's structure is divided into two distinct yet interacting modes. Command Mode is essentially a superset of the normal ED commands, with several useful new instructions added and only a few commands changed in meaning. The main attraction is Video Mode, which has no counterpart in ED. In Video Mode, direct editing on video terminals is possible with the result that all commands are visible immediately. In this mode, WORDMASTER acts much like the editing portion of Michael Shroyer's Electric Pencil, although WORDMASTER does not require a memory-mapped video display.

WORDMASTER is invoked like ED, e.g., with a command like WM TESTFILE.TXT. If this file does not exist, WORDMASTER will create one for you. After a sign-on prompt, WORDMASTER enters Video Mode.

Glenn A. Hart, 44 Bon Aire Circle, Suffern, NY 10901.

# Wordmaster Text Editor

Glenn A. Hart

Some of the existing file, if any, is automatically read in from disc; it is not necessary to manually Append any text. The bottom screen line is reserved in Video Mode, and an Escape will exit Video Mode, enter Command Mode and print the normal Command Mode prompt of "\*" on the bottom line.

## Command Mode

Most of the Command Mode commands listed in Table 1 will be familiar to ED users. Commands which move the character pointer generally operate much as do ED commands. Note that since text does not have to be manually appended at the beginning or during an editing session, ED's "A" command is not needed. ("A" now does a 1L and then enters insert mode.)

"F" and "S" retain their normal meanings, but do their find or substitute only over the next 2000 characters or so or on whatever text is in memory. WORDMASTER adds the "N" and "R" commands to do a "long search" in either direction throughout the entire text file. Extra text will automatically be read in if necessary. Special characters are available for unusual character matching requirements. The "/" command changes branching in nested loops when the find or substitute command fails.

Note that the meaning of "R" is thus changed. WORDMASTER uses two new commands, "Y" and "W", to "yank" files into the file being edited (used to incorporate library files into working text) or write any number of lines to any specified file name. This I/O structure provides complete file management and text manipulation more sophisticated than most editors. Note also that many microprocessor editors limit the maximum size of the text file to the amount of available RAM. WORDMASTER's automatic reading and writing of text permits editing of very large files; the maximum file size is limited only by the capacity of the disc used.

WORDMASTER features a loop structure which allows the user to construct complex repetitive commands. Commands can be nested several levels deep. The "/" command

Table 1  
Command Mode Commands

Command	Meaning
C	Move pointer by characters
D	Delete characters
L	Move pointer by lines
K	Kill lines
T	Type lines
P	Move and type Pages
I	Insert
A	Append
F	Find (short search)
N	Next (long search)
S	Short search & substitute
R	Replace (long search & substitute)
/	Branch (see text)
	Loop delimiters
Y	Yank (read file)
W	Write to file
Z	Sleep (wait)
V	Enter Video Mode
E	End edit
H	End edit and restart
Q	Quit
O	Return to Original file
QP	Put lines to Q-buffer/ Scratchpad, delete from file
QG	Get lines from Q-buffer
QT	Type Q-buffer
QK	Kill (clear) Q-buffer
QX	Execute Q-buffer
QL	Load text into Q-buffer

before any find or substitute command insures that the next command in a nested structure will be executed upon find or substitute failure, rather than an error message being generated.

WORDMASTER implements an extra, separate buffer region which has many uses. Designated as a "Scratchpad" or "Q-buffer," lines can be inserted into this buffer and deleted from the main buffer to be reinserted somewhere else. Thus, block moves are made easy. Several commands are included for manipulating this scratchpad, including the ability to actually execute the scratchpad's contents. In this way, a complex command string can be created and put aside for later use. While this system may not be as



sophisticated as the multiple buffer structure of Xitan's Z-TEL, it is very convenient to use and greatly enhances editing.

### Video Mode

Video Mode is entered from Command Mode with the "V" command. Most Video Mode commands are initiated with control characters. Table 2 lists most of the available commands.

One screenful of text in the general vicinity of the character pointer is displayed whenever Video Mode is entered. Text below or above the displayed screenful can be requested either a line at a time or screenful by screenful.

Complete control of cursor position is easy. Some may quibble with the control characters selected. While the Electric Pencil's control codes have some relation to function (e.g., the diamond shape of the simple cursor control codes), WORDMASTER's codes do allow normal cursor movement without much jumping around. In any event, the user quickly gets used to these code selections.

Unique to the WORDMASTER system is the ability to move the cursor word by word. This is extremely useful in editing normal text, but since the program definition of "word" includes punctuation characters, this feature is slightly less helpful in editing programs.

WORDMASTER is normally in over-write mode, which means that any character typed will replace the one under the cursor. Text can be inserted character by character with the "F" command and characters, words and line segments can be deleted in either direction. Adding entire new lines is even easier with the "N" command, which inserts a carriage return and leaves the cursor positioned immediately before it, thus creating an empty new line to fill.

Several special commands are included. A "J" inserts the next character into the file even if it is a control character. This is useful for inserting control characters like form feed for printers or clear screen for video terminals. "W" repeats the next character or command 4 times; "WW" repeats 16 times, etc. If the user has an IMSAI VIO video display board, either WORDMASTER or NED allows direct control of character size, characters per line, reverse video, etc., and makes all the necessary corrections for the changed display parameters.

**Table 2**  
**Video Mode Commands**

Command	Meaning
^ H	Cursor left character
^ L	Cursor right character
^ J	Cursor down line
^ K	Cursor up line
^ A	Cursor left word
^ D	Cursor right word
^ Z	Cursor right tab stop
^ B	Cursor beginning/end of line
^ ^	Cursor top/bottom of screen
^ E	File down 1 line on screen
^ X	File up 1 line on screen
^ R	File down 1 screenful
^ C	File up 1 screenful
^ F	Insertion on/off
Rubout	Delete character right
^ G	Delete character left
^ /	Delete word left
^ O	Delete word right
^ U	Delete line left
^ P	Delete line right
^ Y	Delete entire line
^ I	Tab
^ N	Insert CR
CR	Insert on: Insert CR Insert off: cursor to beginning next line
^ W	Repeat next character 4 times
^ ]	Put character in file even if control
^ V	Initiate IMSAI VIO control
Escape	Leave Video Mode, return to Command Mode

### User Evaluation

I find the WORDMASTER system to be the most flexible and powerful, yet simple to use, editor I have tried, including editors on large mainframes. Most of my simple editing is done in Video Mode, which is superior to any video-oriented microprocessor editor. I use Command Mode primarily for searches, block moves, and I/O housekeeping. The general similarity to ED makes use of the Command Mode comfortable to any CP/M user, and the complex editing which can be done is occasionally a great time saver.

One command structure which is very useful is jumping back and forth between Command and Video modes. A command like FSAMPLE ZV will locate every occurrence of the string "SAMPLE" in the text file, switch to Video Mode with a screenful of text in

the vicinity of "SAMPLE" displayed and position the cursor immediately after "SAMPLE." This allows determining the context in which each "SAMPLE" is used. Any desired editing can be done in Video Mode, and hitting Escape moves on to the next occurrence.

My only real criticism is probably not fair. WORDMASTER is only sold as a text editor with no provision for text formatting. Micro-Pro suggests that Digital Research's TEX program be used for output formatting, but I find TEX inadequate as a word processor, especially with my Diablo 1620 with proportional spacing. Text prepared with the Electric Pencil looks far more professional. Since I know of no free-standing formatting program with proportional spacing, boldface, underlining, etc., I use WORDMASTER to prepare only programs, not text. If Micro-Pro could incorporate such features into WORDMASTER or offer a separate program of this type, I believe an incredibly powerful word processing system would result.

In any event, I feel WORDMASTER is an excellent program, well worth its nominal cost. The fact that NED is included with IMDOS 2.05 is an unusual bargain. □

Announcing  
the First Business Journal for Microcomputers...

### BusinessComputing Review

At last, you can learn about Business Software and Systems *before* you buy.

**BusinessComputing Review** provides in-depth research reporting into business systems and software currently available.

**BusinessComputing Review** presents the necessary information for businessmen and professionals to plan the installation and use of a microcomputer system. The concise review format simplifies the selection based on business requirements.

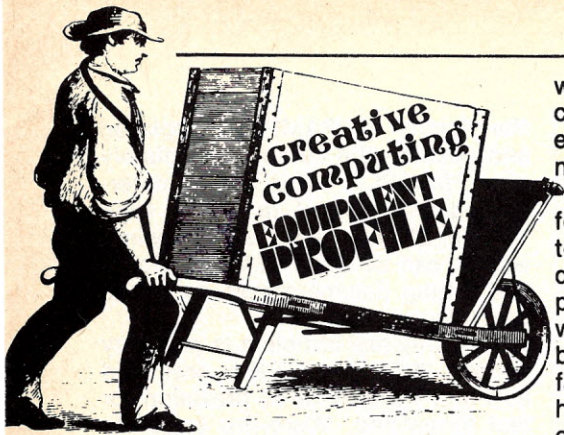
**BusinessComputing Review** reports to you results from extensive testing of software and systems. Opinions expressed are free from the influence of commercial interests because Business Computing Review is supported without advertising.

**BusinessComputing Review** is published six times annually, and is available only to subscribers. Subscription price for Volume 1 is \$25 in the US, Canada, and Mexico. International Subscriptions are \$30.

**BusinessComputing Review**  
BusinessComputing Press  
Post Office Box 55056  
Valencia, CA 91355

CIRCLE 115 ON READER SERVICE CARD





# Malibu 160 Line Printer

**Rod Hallen**

A computer without hardcopy capabilities is only half a computer. I discovered this fact early in my personal computer career. I use my computer not only to write software but also to create, edit and print magazine article manuscripts.

In the two years that I have had a computer, I have purchased three different hard copy devices. The first was a factory reconditioned Selectric (TM) based I/O terminal. For all intents and purposes it was in like-new condition. I really liked the print quality of the Selectric but it had four faults that finally convinced me to sell it.

It was very noisy. Even while it was sitting waiting to receive something to print, it generated a large volume of noise. It was a friction feed model and had to be fed with sheets of paper by hand one at a time. I tried using unperforated rolls of Teletype paper but they would not stay centered on the platen and were soon skewed one way or another. Maintenance was another factor. With dozens of parts whirling around constantly; lubrication, adjustment, and cleanliness were important considerations. The nearest IBM service shop is seventy five miles away and, while they were quite willing to service the Selectric portion of the terminal, I found two weeks to be the average down-time for lubrication and adjustment. However, my biggest complaint had to do with speed. At 15 CPS it often took up to fifteen minutes to print a short manuscript and while it

was printing, I could not use the computer to accomplish anything else. Something faster was definitely needed.

About that time advertisements for the Teletype Model 43 (TM) began to appear. Offering 30 CPS printing, quiet operation, and sprocket-feed paper handling, it seemed that the 43 was the answer to my requirements. I bought one, added an RS-232 interface, and had it working within a half hour after it came out of its shipping case.

The 43 turned out to be exactly as advertised and has given me good service for more than a year now. I have run thousands of sheets of fan-fold paper through it and have never detected a print failure of any kind. Except for simple lubrication that I do myself every few months, it has not required any maintenance whatsoever. It is totally silent except when actually printing and even then the noise level is very low. I am still using the 43 and I particularly like its keyboard which is the best that I've ever used.

Even though the 43 is twice as fast as the Selectric, it is still too slow to meet some of my requirements. That and the fact that it is locked to one size paper because its pin feed platen is not adjustable made me decide to look for something to supplement it.

After six months of studying the specs on more than half a dozen different dot matrix line printers, I decided on the Malibu 160 (see Photo 1). The 160 is manufactured by the Malibu Design Group, 8900G Eton Avenue, Canoga Park CA 91304. Its normal average printing rate is 165

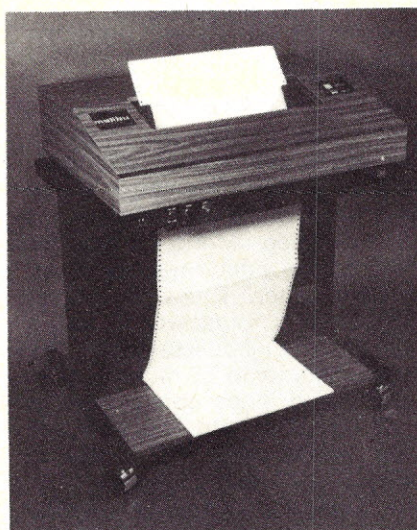


Photo 1. The Malibu 160 shown mounted on its optional stand. It can also sit on a counter and feed paper from the front or from the bottom. The appearance of this unit is outstanding.

CPS and it employs an adjustable form feed tractor. Power requirements are 110 or 220 volts AC - 50 or 60 Hz - 65 watts. Prices start at just under \$2000.

The 160 is shipped in a well-constructed packing case and it arrived in good condition three weeks after I ordered it from the factory. It was accompanied by a very thorough manual which contains sections on operation, theory, hardware and software. This includes an 8080/Z80 source listing of the printer driver software and character set and schematics of the printer and all optional interface boards. 6800 software is also available.

The manual is a good advertisement for the Malibu. It was printed on the 160 and is very attractive and professional.

Without going too deeply into its technical operation, I would like to discuss some of the reasons that I decided on the 160. It obviously answers the two main requirements that I had while looking for a line printer - speed and adjustable paper width. However, there are other machines that also possess these qualities.

Since I use my computer to generate magazine articles, all uppercase only printers were immediately scratched from the list. Potential printer buyers should consider this point carefully. While you may now be buying a printer only for your own use, you might want to submit programs and articles to magazines sometime in the future to gain some financial benefits from your creations. Most magazine editors will not even consider manuscripts that are printed uppercase only.

Interface is another consideration. How easy will it be to connect the printer to your computer and get it going. The Malibu is available with RS-232, S-100, or parallel interfaces. For most potential buyers the first two will be the easiest to implement. Both are plug-in-and-go type arrangements and the only special requirements are the patches necessary in your operating system to call the printer software whenever you have a character to output.

The printer software for the RS-232 and S-100 versions of the Malibu resides in a PROM on the interface board. This software includes not only the driver routines needed to control the printer but also the character set. Since the character set is software generated, it is easily changed. Foreign, scientific, or other exotic character sets are possible.



```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
```

Figure 1. The 160 Character set shown in single and double width modes. The double width characters are good attention getters when used for titles, headings, and posters. A test routine in the printer driver software prints the character set whenever it is called.

Figure 1 is a printout of the ASCII character set that comes with the 160. Single-width characters are printed at ten characters per inch. Note that the tails (extenders) of characters such as g, j, and y are below the line where they belong. This makes for much easier reading. Figure 2 is a sample printout of the enhanced character set, which is the latest release from Malibu, and is quite close to word processing quality.

One bonus is that double-width characters can be printed at any time. When the printer driver software receives a Control N (ASCII 0E hex) it

will print double-width characters until it receives a Line Feed (ASCII 0A hex) or a Control O (ASCII 0F hex). It will then revert to single width printing until another Control N is received.

Double width printing is an attention getter and can be used to head program listings, make your own letterheads and to title pamphlets and home printed documentation.

I chose the parallel interface version of the Malibu. This requires two parallel ports which I already had available in the SOL. It also requires that the software which usually

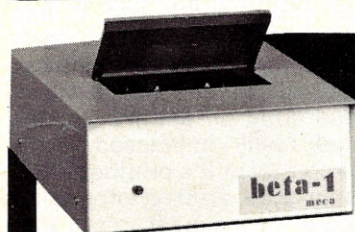
receives its instructions from a computer is accomplished by nine wires which moved horizontally in front of the printer. It takes times to print alphanumeric addition to standard ASCII characters or graphics of any description on paper as with a standard typewriter.

Figure 2. Recently released ENHANCED CHARACTER SET for the Malibu 160, which is very close to word processing quality. Note the difference in these characters and those shown in Figure 1.

resides on the interface board in PROM be loaded into system RAM each time that the computer is turned on. I solved this by recording the Malibu software on disk from which it is easily loaded into memory.

Having the character set in RAM also makes it much simpler to change. In fact, more than one alphanumeric or graphic character set can be stored in memory and called as desired. I have already changed the shapes of some characters to suit my own personal tastes.

The software normally supplied by Malibu is designed to be loaded



## MECA announces beta-1 The stand-alone Tape Storage System.

BETA-1 is the answer to the many requests MECA has received for a universal tape unit. So we are proud to present the first mass storage solution for non-S100 bus microcomputers. Now you can own a BETA-1 complete, assembled and tested, for only \$399.

### STANDARD FEATURES

- Random seek to file at more than 100 inches per second.
- Typical access time is 10 seconds or less.
- Plugs directly into standard 8-bit parallel I/O port.
- Fast load time at 8000 bits per second.
- Reliable — Uses professional phase-encoding technique.
- Internal 8035 microprocessor with 1K byte program.
- Self-contained high level operating system.
- Up to 1 megabyte on-line with a single drive.
- Replaces disk at a fraction of the cost and delivers similar performance.
- Interfaces to most popular microcomputers and requires only a parallel or serial port.

### OPTIONAL ACCESSORIES

- Serial I/O Port
- Double the loading speed for 16,000 bits per second.

The BETA-1 will interface easily to most popular microcomputers. Delivered assembled only (sorry, no kits). Limited quantities available from first production run, SO ORDER NOW!

Sound too good to be true? Then judge for yourself and place your order today. Call MECA, or your favorite dealer, for more details.

Dealer inquiries welcomed.

**MECA**

7026 O.W.S. Road, Yucca Valley, CA 92284  
(714) 365-7686



starting at B000 hex but they will relocate it for you. I ran the source code that they provide through my assembler and now I can put it wherever I want.

The adjustable form feed tractor will accommodate paper in any width between four and fifteen inches. One to four part forms can be used. The paper feeds from either the front or rear of the case at the bottom and it is very simple to change from one type or size to another. Up to 132 characters can be printed on fifteen inch wide paper.

When the printer is initially turned on or the type of paper is changed, the paper is moved up or down with two pushbuttons until the top of the form is positioned for printing and a thumbwheel switch is then set for the number of lines on a page. Since the 160 normally prints six lines to the inch, this switch would be set at 66 for pages eleven inches long. As long as the printer is turned on it will remember these settings.

With this accomplished three different methods of form feed are available. The simplest is a pushbutton that advances the paper to the top of the next page whenever it is operated. The software will also form feed the paper whenever it receives a Control L (ASCII 0C hex).

A switch in the software can provide automatic form feed when desired. When this switch is on the software will count lines and insert a form feed each time that the number of lines equals a number which has been stored in a specified memory location. This is particularly handy when printing program listings where it is difficult to determine in advance where to insert the form feeds.

Another software switch will automatically insert a line feed after each carriage return when desired. This is to take care of user and system software that does not output its own line feeds.

The print quality of the 160 is outstanding. This is due in part to the Hydra (TM) print head that is used. This seems to be a high reliability item and it should last for a long time. The other reason for the good printing is the ribbon. It is continually reinked and runs at an angle so that the entire surface is used.

However, one of my two complaints with the 160 relates to the ribbon assembly. The ribbon is motor driven and is held under tension while the printer is turned on. When the power is shut off the ribbon becomes quite loose and it sometimes lays against the paper causing large black

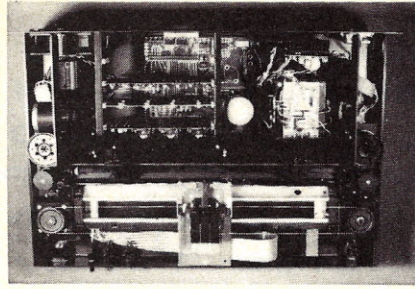


Photo 2. The interior of a well-engineered printer.

stains. The paper is also not held tightly enough against the print bar (a sort of metal platen) and the folds in the fan fold paper sometimes touch the ribbon as they advance and pick up small black smudges. This could probably be taken care of by adjusting the posts that position the ribbon in front of the print head but I haven't attempted it yet.

My other complaint has to do with the cooling fan. This runs all of the time and it is very noisy. It also vibrates the paper which is feeding out of the top of the machine. As far as I can tell the only function that the fan serves is to cool some power resistors that are in the printer motor circuit. The solid state control circuitry does not even get warm.

One very definite advantage that dot matrix printers have over the Teletype and Selectric based mechanical printers is the almost total lack of moving parts. There are no spinning mainshafts, no sliding and bouncing selector fingers and no pounding print hammers. The print head is moved into position and anywhere from one to nine slender wires force the ribbon against the paper in a predetermined vertical dot pattern. Five such patterns make up one character.

One contribution to print speed is provided by the 160 software. Characters are not printed one at a time as they are output to the print software. Instead, they are stored in a RAM buffer until a carriage return is received or the 132 character buffer is full.

The software then compares the present position of the printhead with the number of characters to be printed. If the printhead is closer to the place where the new line will end rather than where it will begin, the line will be printed backwards. For instance, if the line just printed is 40 characters long and it was printed from left to right the print head will be sitting at position 41. If the next line is 128 characters long, the head will return to the beginning of the line (home position) to print it.

If the head has just finished printing a 90 character line forward and the next line is 110 characters long, it will line feed, advance to position 110, and print this new line backwards. All of this happens so fast that it appears that the head is constantly sweeping back and forth, printing as it goes. That fifteen minute manuscript now takes less than one and a half minutes.

As I mentioned earlier, I bought the 160 with the parallel interface which requires two output ports and one input port. The output ports provide character data and printer control and the input port senses printer conditions such as head not home, out of paper and form feed in progress.

### Conclusion

The first thing that you notice about the Malibu 160, both in its literature and in person, is its appearance. The 160 is housed in a beautiful wood grained Formica (TM) case. Upon removing the case (very easily done) you discover that the inside is just as beautiful as the outside. Beautiful, that is, measured from an electronic point of view. Here is a sturdy, well-built mechanism that looks like it ought to last a lifetime.

I have been running the Malibu 160 for about two months and it has performed flawlessly. While I don't have any software yet to do graphics, pictures, or other exotic things, I have seen these done on another Malibu and I was really impressed. With complete control of the printhead it is possible to also print photographs composed of dots similar to the way in which newspaper photos are printed.

A set of graphic characters such as those used by the TRS-80 (TM) can also be substituted for or combined with alphanumeric characters to allow your computer printouts to copy your video screen graphics. I'm working on some software to generate printer graphics right now. With custom software the print head can be moved horizontally or vertically in 1/60 of an inch increments.

I feel that I made the best possible printer purchase within my price range and I haven't regretted my choice. Some non-computer oriented magazine editors don't particularly like dot matrix character printing but I feel the new enhanced character set will bring them around. In the meantime, my word processor and my line printer save me an enormous amount of time that I would otherwise spend hand typing manuscripts. □



## Glossary

**Alphanumeric character set** - Consists of all of the alphabetical and numerical characters. It may or may not include lowercase letters and punctuation.

**ASCII** - American Standard Code for Information Interchange. The standard computer alphanumeric code.

**Buffer** - In this context means a memory storage area.

**Canned Programs** - Programs designed to load and go without any programming effort on the part of the user.

**Control characters** - ASCII control codes created by depressing the keyboard Control key and the desired character at the same time.

**CPS** - Characters Per Second. A measure of a printer's operating speed.

**Dot Matrix** - A printer or video screen display method in which characters are drawn with a series of dots.

**Friction Feed** - Printer paper feed method designed to be used with unperforated roll or sheet paper such as on a standard typewriter.

**Graphic Character Set** - A group of various shapes which are combined to draw pictures, graphs, charts, etc.

**Hardcopy** - Printed material as opposed to a video screen which produces softcopy.

**Hex** - A number base system that counts by sixteen instead of ten as the decimal system does. The hex characters are 0-1-2-3-4-5-6-7-8-9-A-B-C-D-E-F.

**Interface** - Usually required to connect peripherals to a computer. It satisfies the control and data signal requirements of both the peripheral and the computer.

**I/O Terminal** - Equipment designed to allow both input to and output from a computer. The input is usually from a keyboard. The output is usually to a printer or video screen.

**Parallel Interface** - Interface in which all signals paths are presented at the same time as opposed to a serial interface where signals are presented one at a time.

**Platen** - The rubber roller on a typewriter or metal plate in a printer which absorbs the impact of the printing mechanism.

**PROM** - Programmable Read Only Memory.

**RAM** - Random Access Memory.

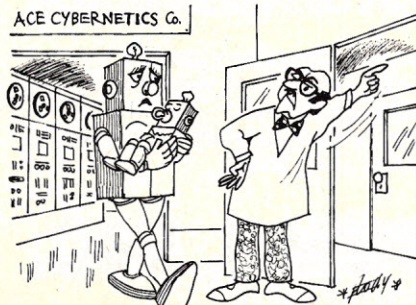
**RS-232** - A serial data interface standard in which a data 1 is represented by a +5 to +15 volt level and a data 0 is represented by a -5 to -15 volt level.

**S-100** - A bus standard used with most 8080/Z80 microprocessors.

**Source Listing** - An assembler program in symbolic code (mnemonics and labels) which can be easily interpreted by those familiar with assembly-language programming.

**Sprocket feed** - Paper feed method that uses pins which fit into holes in the paper to hold and move it. Variations are called pin feed and tractor feed.

**Uppercase only** - Prints the ASCII 64 character subset which includes uppercase letters numbers and punctuation.



© Creative Computing

# Apple II is at The Computer Store



The Apple® II, today's most popular personal computer, is at The Computer Store. Along with the latest in Apple peripherals. Like the new Disk™ II floppy disk drive. Or, printer and communications interfaces. And, the latest in software including the new Apple/Dow Jones Stock Quote Reporter. The compact Apple II gives you 48K RAM memory with full color graphics and high resolution graphics. It's the most powerful computer in its price range.

At The Computer Store, we have more than ever before in microcomputers, memories, terminals and peripherals. All backed by a technical staff and a full service department. Stop in today, you'll find more than ever before at The Computer Store.

## The Computer Store

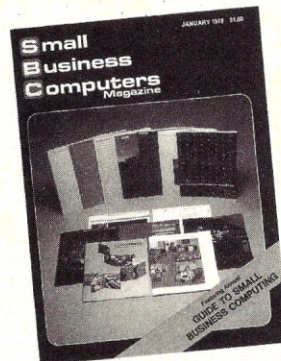
820 Broadway, Santa Monica, California 90401 (213) 451-0713

*The Original Name In Personal Computer Stores*

**Store Hours: Tues.-Fri., 10 am-8 pm, Saturday, 10 am-6 pm**

Located two blocks north of the Santa Monica Freeway at the Lincoln Blvd. exit. Phone and mail orders invited. BankAmericard/Visa and Master Charge accepted.

CIRCLE 124 ON READER SERVICE CARD



# COMPUTER POWER FOR BUSINESS

**SUBSCRIBE TO THE MAGAZINE THAT COVERS EVERYTHING YOU NEED TO KNOW ABOUT CHOOSING AND USING COMPUTERS.**

- The best computer for your business
- How business people use microcomputers
- Computer primer
- Introduction to business software
- Answers to your questions
- Advice from experts
- How to deal with suppliers
- Computer profit windfalls and hidden costs
- Best buys in computer equipment
- Scanning the stockmarkets
- Computer contracts
- Service bureaus vs. in-house computers
- Small computers in large corporations

**Small Business Computers Magazine**  
33 Watchung Plaza, Montclair, NJ 07042

☐ Check Enclosed ☐ Bill me

Name \_\_\_\_\_ CC-5/79

Address \_\_\_\_\_

Company \_\_\_\_\_

City/State \_\_\_\_\_ Zip \_\_\_\_\_

**SUBSCRIBE NOW!**  
**One year for only \$9!**  
(1/2 newsstand price)  
subscription fee may be business  
expense tax deductible



# POWERFUL INTERFACES

## S-100 RS-232 CONTROL CARD

### 8-SERIAL I/O CHANNELS

MODEL 232-100K (KIT) - \$149.95

MODEL 232-100A (ASSEM.) - \$179.95

**A MUST FOR THE SERIOUS USER:** NOW, FROM A SINGLE SERIAL I/O PORT YOU CAN SEND AND RECEIVE DATA TO ANY OF THE 8 CHANNELS WITH A SIMPLE SOFTWARE COMMAND EITHER IN BASIC OR MACHINE CODE.

- **INDIVIDUAL BAUD RATES:** Each channel can be set for its own individual baud rate via a dip switch. Card contains its own on board baud rate generator chip and crystal. The RS-232 Control Card will run any S-100 Microprocessor because of its on board timing clock.

- **ALL HARDWARE:** Yes this has our "ALL HARDWARE" software match setting features. You are able to select and set status, its parity to match any software configuration. NO NEED TO CHANGE THE SOFTWARE TO MATCH THE BOARD.

- **SIMPLE OPERATION:** Only one port to configure. It's easy to set and run. You just output from Basic or your machine code program the Port # and Bit 1-8. By turning on bits one through eight you're able to direct your output to any RS-232 device. An extra feature is, you are able to run more than one RS-232 device at a time. Output and input from all 8 if you want.

- **EASY CONNECTION:** On top of the board are two 50 pin edge connectors. Supplied with the board are two cables with 40 Pin IDC connectors on one end and four DB-25 connectors on the other. All cables for connection from board to I/O devices is supplied.

- **HIGHEST QUALITY:** The highest quality parts are used. The P.C. board is double sided with plated through the holes, solder mask and silk screened legend.

- **FULL DOCUMENTATION:** A complete manual of operation and assembly is included.

## S-100 Z-80 CENTRAL PROCESSING UNIT

MODEL Z-80100K (KIT) - \$129.95

MODEL Z-80100A (ASSEM.) - \$139.95

- Selectable power on jump to any memory address.
- Provisions for on board EPROM.
- True generation 8080 Q1 and Q2 clock signals.
- Selectable wait states on M-1 cycle memory request cycle, on board ROM cycle, and input-output cycles.
- True DMA tri states for all signals from processor board.
- All status signals are latched per the S-100 BUS specifications.
- Unit includes high speed Z-80A Microprocessor chip, 4 Mhz operation - can be switched to 2 Mhz, if so desired.
- Power requirements — +8volts @ 1.0amps.

\*TRS-80 is a trademark of Tandy Corp.



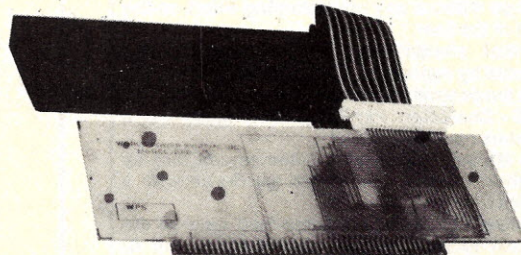
# WORLD POWER SYSTEMS, INC.

1161 N. El Dorado Place, Suite 333, Tucson, Arizona 85715  
24 Hour Order Phone No: 602-886-2537

## TRS-80\* TO S-100 BUS CABLE ADAPTER

MODEL CAB-80K (KIT) \$99.95

MODEL CAB-80A (ASSEM.) \$119.95



- **FULL INTERFACE:** Contained within the cable assembly, is a small enclosure. This enclosure contains all the logic to convert your TRS-80\* to be compatible with the S-100 BUS system.

- **FULL BUFFERING:** All address, data and signal lines are fully buffered.

- **EASY CONNECTION:** It is easy to connect. Just plug the one end of the cable into the one slot on your S-100 system and plug the other end into the rear of the TRS-80\* keyboard or between the expansion interface. Turn on and go.....

- **TWO EDGE CONNECTORS:** Two addition 40 pin port edge connectors are provided for other connection of expansion interfaces.

- **POWER:** All power is derived from the S-100 BUS structure. Since the TRS-80\* will not support other devices hooked to its power supply, it is a must that your S-100 supply 8-10 volts D.C. Logic card contained within the cable has on board 5 volt regulator. Current requirements are 375 ma. Unit has separate terminal for exterior connection of DC power requirement, if it is to be supplied outside the S-100 BUS system.

- **FULL OPERATION MANUAL:** Not much need for a manual, but we have prepared one with full principal of operation, etc.

## TRS-80\* 16K MEMORY ADD-ON KIT

FOR THE TRS-80\* — SORCERER† — APPLE II† 8-PRIME, 250NS HIGH SPEED MEMORY CHIPS  
MODEL 16K-80 - \$95.00

- All chips are new, top quality, factory fresh and tested.

- Each kit comes with complete, simple to understand instructions. Even the least experienced individual can add on memory.

- Comes complete with programmed jumpers.

- **Guarantee:** If a chip fails, we will replace it with no questions asked. Lifetime guarantee!

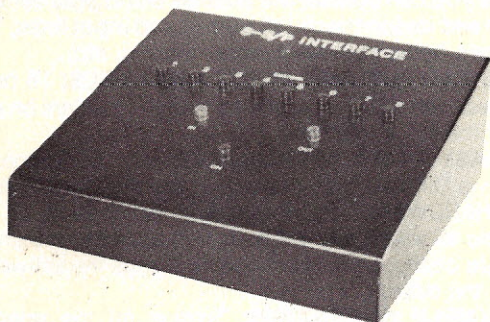
- Remember: These are top quality prime #1 chips. All orders shipped same day as received!



# POWERFUL INTERFACES

## TRS-80\* SERIAL PARALLEL I/O MODULE

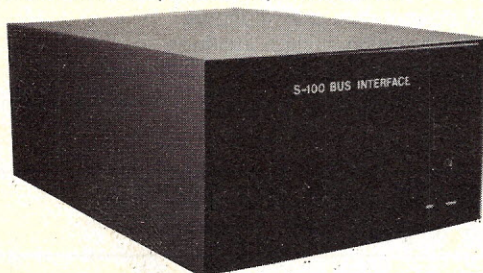
8-SERIAL INPUT/OUTPUT PORTS:  
8-PARALLEL INPUT/OUTPUT PORTS:  
MODEL MSIO-K \$129.95  
MODEL MSIO-A (ASSEM.) \$149.95



- **EASY CONNECTION:** Connects to the expansion port edge card connector between keyboard and expansion interface or direct to rear of the TRS-80\* keyboard.
- **DIP SWITCH:** All ports, baud rate, parity, etc. all set by dip switches.
- **ON BOARD FIRMWARE:** No software driver routine needed for operation of the module. Simple OUT and IN statements operate the module.
- **RS-232, CURRENT LOOP:** All 8 channels can be selected for RS-232 or current loop.
- **BAUD RATE SELECTION:** All channels dip switch selectable for individual baud rates from 110 to 9600 baud.

## TRS-80\* TO S-100 BUS

MODEL RSB-K (KIT) - \$249.95  
MODEL RSB-A (ASSEM.) - \$289.95



- **FULLY SELF CONTAINED POWER SUPPLY.** (10 AMP).
- **BUS TERMINATION:** BUS termination and conditioning for no cross talk or noise etc.
- **S-100 SIGNALS:** All required S-100 signals are generated by on board logic and is fully compatible with the TRS-80\*.

\*TRS-80 is a trademark of Tandy Corp.



# WORLD POWER SYSTEMS, INC.

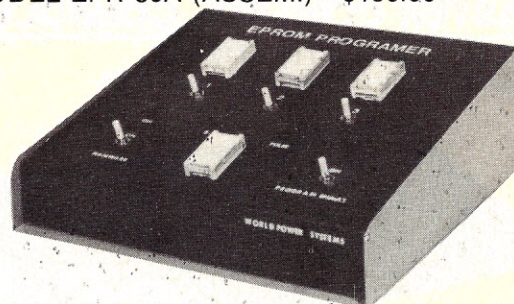
1161 N. El Dorado Place, Suite 333, Tucson, Arizona 85715

24 Hour Order Phone No: 602-886-2537

- **COMPLETE:** Comes complete with cabinet, card guides, on-off switch and sockets. Nothing else to buy.
- **STAND ALONE:** This system can stand alone or can operate with the TRS-80\*. All input, output, address and signal lines fully buffered between TRS-80\* and S-100 BUS system.
- **EASY CONNECTION:** Just plug it into the rear of the keyboard or between the keyboard and expansion interface. Also includes 40 pin edge connectors for connection to other interfaces.

## TRS-80\* EPROM PROGRAMMER +3

MODEL EPR-80K (KIT) - \$129.95  
MODEL EPR-80A (ASSEM.) - \$159.95



- **SELF CONTAINED:** Comes housed in an attractive cabinet with self contained power supply.
- **PROGRAMS:** This unit programs the popular 2708, 2716 EPROMS. Personality modules for other EPROMs will be available at a later date.
- **FIRMWARE:** On board firmware so that no software need be written or entered into your CPU system. The firmware can be shut off when not in use. Firmware residents at F000. The firmware in and out of system is controlled from a switch on front panel.
- **3-ADDRESSABLE ROM LOCATIONS:** The EPROM Programmer has three sockets on front panel which are addressable to any location by dip switch. In addition each ROM location can be shut off or turned on by switches located on the front panel.
- **MONITOR:** A monitor is supplied within the firmware for performing several functions. Move memory, debug, verify, program from memory, program from TTY input, etc.
- **EASY CONNECTION:** The EPROM Programmer is attached with ease. For the TRS-80\* users, the unit plugs into the rear of the keyboard or between the keyboard and expansion interface. Included with the unit are two additional 40 pin edge connections for interfacing of other interfaces. For the S-100 users, a molded connection cable is supplied and it is inserted into one of the connectors on your mother board. Plug it in and it is ready to use.
- **FULLY BUFFERED:** add address and data lines are fully buffered.
- **OTHER FEATURES:** Other features include status lights for which ROM selected, switch enable for programming, pulse (burn) indicator firmware select-deselect switch, on, off and dip switches for the addressing of each ROM location.



# POWERFUL INTERFACES

## TRS-80\* EXPANDOR INTERFACE

MODEL EI-80K (KIT) - \$329.00

MODEL EI-80A (ASSEM.) - \$349.00

- 32K high speed 250NS memory.
- Disc controller which controls mini or 8" floppies.
- RS-232 Port.
- Parallel Port
- Self contained heavy duty power supply. Plugs directly into rear of TRS-80\* keyboard. Comes in attractive cabinet. **Twice the value for what you would spend for a TRS-80\* expansion interface.**

## TRS-80\* MASTER CONTROL CONSOLE

MODEL MCC-K (KIT) - \$129.95

MODEL MCC-A (ASSEM.) - \$159.95



**A COMPLETE COMMAND CENTER FROM YOUR KEYBOARD OR FROM ANY LEVEL II OR DISC BASIC PROGRAM.** Turn on bells, sprinklers, sense fire and burglar alarm, anything that needs a switch can be controlled by the command center.

- **16 OUTPUT LINES:** With 8 relays, SPST, and 8TTL diode protected signals.
- **16 INPUT LINES:** 8 lines with OPTO-COUPLEDERS and 8 ITL diode protected.
- **FULL LED PANEL:** For status indicators of all control lines.
- **COMPLETE WITH CABINET:** Has attractive sloping cabinet.
- **FULLY HEAVY DUTY POWER SUPPLY:** Contains power supply. No external power needed.
- **EASY CONNECTION:** Plugs into TRS-80\* expansion port edge card rear of keyboard or between keyboard and expansion interface.
- **2-EDGE CONNECTORS:** 2-additonal expansion 40 pin edge connectors.
- **NEEDS NO SOFTWARE:** Operates from OUT and IN statements from BASIC or machine code statements. Example: (Out 5, 1=turn on switch 5. Out 6, 1=turn off switch 5, etc.)
- **COMPLETE MANUAL AND SAMPLE PROGRAMS:** Comes with comprehensive manual and sample programs.

\*TRS-80 is a trademark of Tandy Corp.



# WORLD POWER SYSTEMS, INC.

1161 N. El Dorado Place, Suite 333, Tucson, Arizona 85715

24 Hour Order Phone No: 602-886-2537

## S-100 BUS MASTER CONTROL CARD

MODEL MCC-100K (KIT) - \$159.95

MODEL MCC-100A (ASSEM.) - \$189.95

### TURN IT ON.....TURN IT OFF

Now you can control the outside world plus sense its status and its functions. 16 output and input lines. Turn on those bells, activate burglar alarms, etc.

- **16 OUTPUT AND INPUT CHANNELS:** 16 output channels with SPST relay on each. Opto-couplers on each one of the input channels.
- **EASY PORT ASSIGNMENT:** Port assignment is made via DIP SWITCH. In addition this board features our "ALL HARDWARE" software match setting features. You are able to select and set status, its parity to match any software configuration. No need to change the software to match the board.
- **SIMPLE OPERATION:** Turning off the relays is commandable by addressing a port, plus turning a bit on or off. Sample: You're in basic and you want to turn on switch 16. You would write out 3, 16. This turns on switch 16. To turn it off you would write out 4, 16 and off it is.
- **HIGH QUALITY:** The highest quality parts are used. The P.C. board is double sided with plated through holes, solder mask and silk screened legend.
- **FULL DOCUMENTATION:** A complete manual of operation and assembly is included.

## TRS-80\* DISC CONTROLLER MODULE

MODEL DCM-80K (KIT) - \$159.95

MODEL DCM-80A (ASSEM.) - \$189.95

Option available: 1) 16K RAM Kit, high speed 250 NS with purchase of board - Special \$85.00.

- Has provisions for 16K memory.
- Will control mini or 8" floppies.
- DOS operating system included.
- Plugs directly into rear of TRS-80\* keyboard.
- Complete with power supply in attractive cabinet.

## S-100 8K STATIC 250NS RAM MEMORY CARD

MODEL 8K-100K (KIT) - \$119.95

MODEL 8K-100A (ASSEM.) - \$139.95

- Fully buffered address, control and data lines.
- Memory protect and unprotect.
- Power on clear.
- Bank select feature for selection to any 64K quadrant.
- Battery backup.
- Will run with any Z-80 Microprocessor without need of wait states.
- S-100 BUS power requirement 1.4 amps.

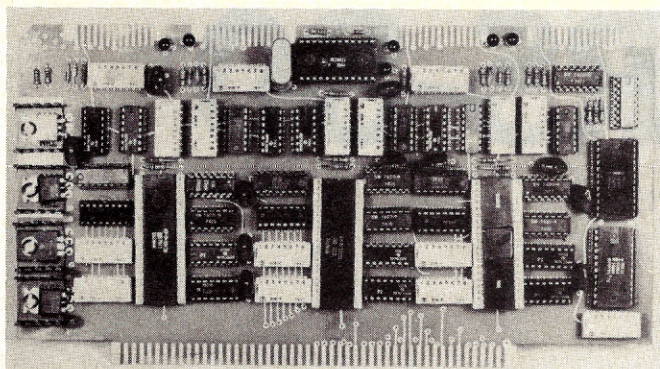


# POWERFUL INTERFACES

## S-100 3 S+P INTERFACE CARD

MODEL 3 S+P-100K - \$159.95

MODEL 3 S+P-100A - \$189.95



A powerful I/O interface card for any S-100 BUS. Three serial ports and one parallel port. Fully hardware operated. No software initialization required. In addition, this board will operate with any software. User is able to select status bits to fit any software configuration.

- **SELECTABLE BAUD RATES:** All baud rates are dip switch selectable. Each port can be set for its own baud rate. CRYSTAL CONTROLLED baud rates. This interface card can operate with any Microprocessor at any speed. The 3 S+P does not depend on the CPU for its originating clock. 110-9600 baud.

- **EASY CONFIGURATION:** The 3 S+P is easy to set. All port addresses are set by dip switches. Each port can be assigned independent of each other.

- **SOFTWARE COMPATIBLE:** The 3 S+P will be compatible with most software arrangements due to the ability to set the status bits and the parity. Parity, character length, stop bits all set by dip switches. Each port can be set to its own individual arrangement.

- **HIGH QUALITY:** The highest quality parts are used. P.C. Board is with plated through holes, solder mask, silk screen legend and gold plated contacts.

- **OUTPUT ARRANGEMENT:** All outputs terminate at the top of the card via a 26 pin IDC connector. Standard 26 pin IDC connectors mate with each port. RS-232, current loop at each serial port and full data lines at the parallel port connection. Operation is asynchronous mode, but can be configured for synchronous operation by minor reconfiguration.

- **FULL DOCUMENTATION:** A complete manual of operation and construction is included. Easy construction and 3 hours is the estimated construction time. Just plug in, set the switches and enjoy all the different configured software. NO MORE changing the software to match I/O board. Just set the board and enjoy.

## S-100 VIDEO DISPLAY BOARD

MODEL VID-100K (KIT) - \$119.00

MODEL VID-100A (ASSEM.) - \$139.00

- Provisions for plugging in keyboard.
- 16 lines at 64 characters
- Full upper and lower case.
- Ascii key, character set, symbols, greek letters, and numbers.
- 7x9 dot matrix in an 8x10 field.
- Normal and reverse video, and blinking cursor.
- Compatible with CPM.
- A natural for text editing.
- Comes with software driver in ROM which provides scroll up and down, full cursor positioning, flashing and field characters.

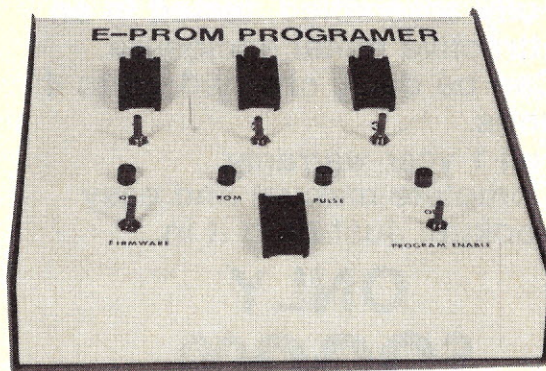
Specifications are: S-100 BUS compatible, high speed 1K memory. Voltage requirements - +8 volts @900MA, +16volts @40MA, -16volts @ 100MA. Output is standard video.

Epoxy glass double sided with plated through holes, solder mask and silk screened legend for easy assembly and servicing.

## S-100 EPROM PROGRAMMER +3

MODEL EPR-100K (KIT) - \$129.95

MODEL EPR-100A (ASSEM.) - \$159.95



All the same features of the TRS-80\* model. Comes complete with interface cable, S-100 plug-in card. Totally self contained power supply, plus many other extras.

## S-100 DISC CONTROLLER CARD TRS-80\* DISC DRIVES

MODEL DC-80K (KIT) - \$169.00

MODEL DC-80A (ASSEM.) - \$189.00

With the use of our interface cable or S-100 BUS system for TRS-80\* computers this card controls mini or 8" floppies.

On board firmware with WDOS operating system, video driver, and keyboard driver which allows user to run any type of software available and emulates basic software driver resident in keyboard, if user so desires.



\*TRS-80 is a trademark of Tandy Corp.

# WORLD POWER SYSTEMS, INC.

1161 N. El Dorado Place, Suite 333, Tucson, Arizona 85715

24 Hour Order Phone No: 602-886-2537

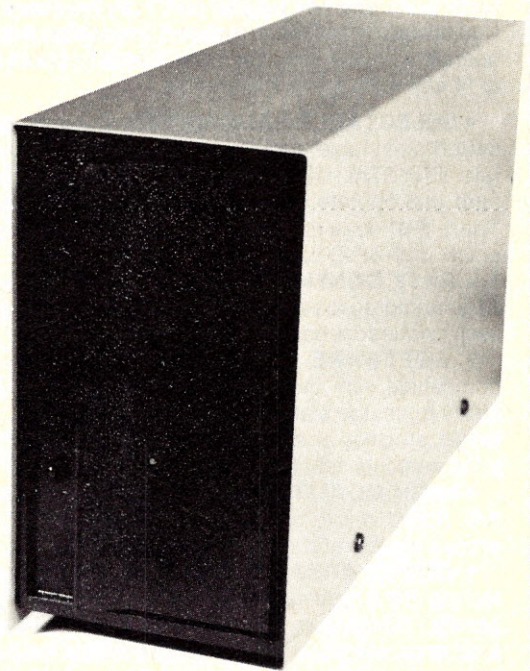


# **NEW RELEASE!!**

# **Disk Drives For The TRS-80\***

- Complete with 4 Drive Daisy Chain Cable
- Nothing else to buy. Complete with power supply. Just plug into your expansion interface.
- Fully assembled, tested in an attractive metal enclosure.
- Can be daisy chained up to 4 units.
- Full 1 year warranty.
- Complete manual and easy hookup. Just plug it in.

**ONLY**  
**\$390<sup>00</sup>**



Requires 16K RAM, Level II Basic and Radio Shack TRS-80 expansion interface or World Power Systems expander interface or disc controller module. See our catalog sheet. TRS-80 is a trademark of the Tandy Corp.



\*TRS-80 is a trademark of Tandy Corp.

## **WORLD POWER SYSTEMS, INC.**

1161 N. El Dorado Place, Suite 333, Tucson, Arizona 85715  
24 Hour Order Phone No: 602-886-2537



# 16K MEMORY ADD-ON KIT

**FOR THE TRS-80\* - SORCERER‡  
APPLE II†  
8-PRIME, 250 NS HIGH SPEED  
MEMORY CHIPS**

**\$95<sup>00</sup>**

- **All chips are new, top quality, factory fresh and tested.**
- Each kit comes with complete, simple to understand instructions. Even the least experienced individual can add on memory.
- Comes complete with programmed jumpers.

## **GUARANTEE**

If a chip fails, we will replace it with no questions asked.  
Lifetime guarantee!

Remember: These are top quality prime #1 chips. All orders shipped same day as received!

## **TERMS**

CASH WITH ORDER, VISA, MASTER CHARGE. NO C.O.D.'S! PERSONAL CHECKS REQUIRE 3 WEEKS TO CLEAR.

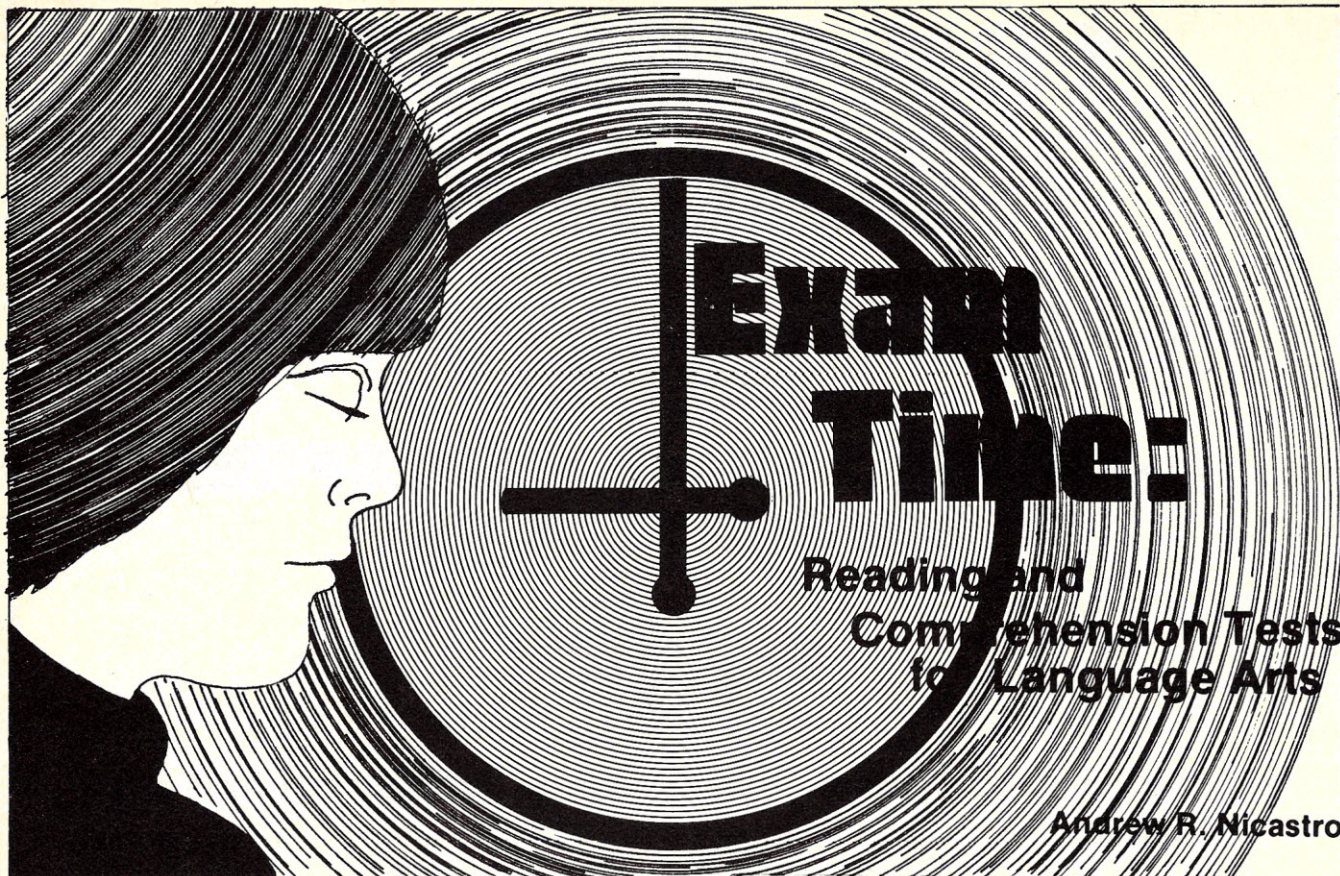


# **WORLD POWER SYSTEMS, INC.**

\* TRS-80 is a trademark of Tandy Corp.  
‡ Sorcerer is a trademark of Exidy, Inc.  
† Apple II is a trademark of Apple Computer, Inc.

**WATCH FOR MODULE 50**





Andrew R. Nicastro

A secondary school plans to spend, or has spent, a large sum of money on a computer for classroom use. How can the school optimize cost/effectiveness? How can teachers maximize utilization of the equipment, and involve as many students as possible? This is a central concern of all involved — students, teachers, parents, administrators, and board members. Using the computer in teaching computer programming, introductory computer science, and problem solving in mathematics come first to mind. Although these may be the central reasons for having a classroom computer in a small secondary school, they may, however, pertain to only a handful of students. Using the system for simulation and lab assistance in science classes will involve additional students. Still more can use the system for computer assisted instruction, and for drill and practice work in many disciplines. While many programs have been written for developing skills in mathematics and science, fewer have been written that address the needs of other subjects and that run on a small system. The program that follows was created for the developmental reading class at **The American School of The Hague**, Netherlands. The class is for high school students who have difficulty reading. Students use the program to improve learning and reading comprehension. The program runs on a mini computer — a PDP 11-03.

**What the program does:** The program makes a video display unit act like a tachistoscope. It presents text to a student leaving each phrase on the screen for a specified time interval. At the end of the text, it asks the student multiple choice comprehension questions. The materials that follow here — a documented listing, annotated sample text file, sample run, and listing of a student record file — thoroughly describe the program.

**How we use the program:** The reading teacher selects paragraphs to be read. He underlines the text phrase by phrase; and he writes appropriate comprehension questions. One of the students from the typing class transfers the paragraphs and questions into a data file on the system. After the reading teacher has proof-read the file, a student computer aide enters the file name in the list of legal text files (see DATA lines 1860 to 1899 in 9PACER.) Since the reading teacher does not have a terminal in his room, he sends one or two students at a time to the computer room to run several exercises. At the end of the day or week, the reading teacher has one of the computer aides get a listing of the student record file on the printer. On our system, two students can run the program simultaneously provided they are logged on under two different USERID's.

The students and the reading teacher are enthusiastic about the program. It has prompted interest in the computer among other teachers as well. One of the language teachers, for example, has asked about the possibility of developing grammar drills for French classes. Finally, the program served as a very appealing demonstration for parents' night. ■

Andrew R. Nicastro, The American School of the Hague, High School Division, Paulus Buysstraat 51, The Hague, The Netherlands

Andy Nicastro is the chairman of the high school mathematics department at The American School of The Hague, Netherlands, and is also in charge of the computer system there. The American School of The Hague is a private school for children of American businessmen and diplomats living in The Netherlands. The high school has three hundred and forty students.



```

5 '
10 '
15 '
20 '
25 'BY ANDREW R. NICASTRO
30 ' THE AMERICAN SCHOOL OF THE HAGUE
35 ' HIGH SCHOOL DIVISION
40 ' PAULUS RUYSSSTRAAT 51
45 ' THE HAGUE, NETHERLANDS
50 '
55 'VERSION 1
60 'OCTOBER 1977.
62 '
65 '
70 '
75 '
80 '
85 '
90 '
95 '
100 '
105 '
110 '
115 '
120 '
122 '
125 '
130 '
135 '
140 '
145 '
150 '
155 '
160 '
165 '
170 '
175 '
180 '
185 '
190 '
195 '
200 '
205 '
210 '
215 '
220 '
225 '
230 '
235 '
240 '
242 '
243 '
245 '
250 '
255 '
260 '
265 '
270 '
272 '
273 '
275 '
280 '
285 '
287 '
290 '
292 '
293 '
295 '
300 '
305 '
306 '
307 '
308 '
309 '
310 '
315 '
320 '
325 '
327 '
330 '
335 '
337 '
340 '
350 '
355 '
360 '
365 '
370 '
372 '
373 '
375 '
380 '
385 '
390 '
395 '
400 '
402 '
403 '
410 '
415 '
420 '
425 '
430 '
435 '
440 '
442 '
445 '
455 '
460 '
465 '
470 '
475 '
480 '
485 '

```

PROGRAM 9PACER

READING SPEED AND COMPREHENSION

PROGRAM DESCRIPTION

OVERVIEW

PROGRAM 9PACER DRILLS READING SPEED AND TESTS COMPREHENSION. IT PRESENTS TEXT PHRASE BY PHRASE AND DISPLAYS EACH FOR A SPECIFIED TIME INTERVAL. AT THE END OF THE TEXT, THE PROGRAM TESTS THE USER'S COMPREHENSION WITH MULTIPLE CHOICE QUESTIONS. AT THE END OF THE SESSION THE STUDENT'S RESULTS ARE DISPLAYED AND WRITTEN TO A FILE.

THE SEQUENCE OF EVENTS

THE PACER PROGRAM IS IN TWO PARTS, 9PACER AND 9PACE1. 9PACER COPIES THE OLD STUDENT RECORD FILE, AND PRINTS A NEW HEADER AT THE END OF THE FILE WITH THE CURRENT DATE. IT THEN REQUESTS INFORMATION FROM THE USER: NAME, THE NAME OF THE TEXT FILE TO BE READ, THE TIME INTERVAL EACH PHRASE IS TO REMAIN ON THE SCREEN, AND THE NUMBER OF PHRASES PER LINE. FINALLY, IT CHAINS 9PACE1 PASSING THIS INFORMATION VIA THE COMMON STATEMENT.

9PACE1 OPENS THE TEXT FILE, CLEARS THE SCREEN AND PRESENTS TEXT AS SPECIFIED UNTIL THE FIRST OCCURRENCE OF C IN THE TEXT FILE. THEN IT PRESENTS EACH COMPREHENSION QUESTION AND WAITS FOR THE STUDENT'S RESPONSE. AFTER THE STUDENT ENTERS HIS ANSWER, 9PACE1 COMPARES IT TO THE CORRECT ANSWER THAT IS IN THE TEXT FILE. THE PROGRAM THEN PRAISES CORRECT RESPONSES OR INFORMS THE STUDENT THAT HE WAS WRONG.

AT THE END OF THE TEXT FILE, THE PROGRAM SUMMARIZES THE RESULTS OF THE SESSION DISPLAYING THE STUDENT'S NAME, DATE, NAME OF TEXT FILE, PHRASES/LINE, AND TIME/PHRASE ON THE SCREEN; AND IT WRITES THE SAME INFORMATION TO THE STUDENT RECORD FILE, PACER.DXX, WHERE XX IS THE USER'S USERID - USUALLY A GROUP ID. 9PACE1 ENDS WITH A SERIES OF QUESTIONS ABOUT WHETHER OR NOT THE CURRENT USER OR ANOTHER WISHES TO RUN THE PROGRAM AGAIN.

SOME SPECIFICATIONS

THE PROGRAM WAS DEVELOPED ON A PDP MUI1V03 OPERATING UNDER MU BASIC/RT-11. IT IS USED WITH RX01 DUAL FLOPPY DRIVES AND A VT52 VIDEO DISPLAY. MODIFICATION FOR OTHER DISPLAYS ENTAILS CHANGES TO LINES 395 AND 502 IN 9PACE1. THESE LINES CLEAR THE SCREEN.

STRING FUNCTIONS: CHR\$, DAT\$, SEG\$

OTHER FUNCTIONS: INT, RND, SYS(8) TO DISABLE <CTRL>C, SYS(7) TO REENABLE <CTRL>C, TAB

SOME STATEMENTS: CHAIN, COMMON, CLOSE, IF...THEN STATEMENT, INPUT #1, KILL, NAME, OPEN

KEY VARIABLES: A\$ = TEXT FILE, N\$ = STUDENT'S NAME, T = TIME INTERVAL FOR EACH PHRASE, P = NUMBER OF PHRASES PER LINE

RUN-TIME LENGTH WITHOUT REM STATEMENTS: 9PACER = 3200 BYTES; 9PACE1 = 3850 BYTES.

9PACE1 TAKES ADVANTAGE OF A FEATURE OF THE IF...THEN STATEMENT IN MU BASIC THAT IS NOT FULLY EXPLAINED IN THE MANUAL: SUPPOSE THE IF...THEN STATEMENT IS ON A LINE CONTAINING MULTIPLE STATEMENTS AS FOR EXAMPLE,

```

N IF X>Y THEN XXX \ STATEMENT 1 \ STATEMENT 2
N+1 STATEMENT

```

WHEN X>Y IS FALSE AND WHEN XXX IS A LINE NUMBER, CONTROL PASSES TO THE NEXT SEQUENTIAL STATEMENT, NAMELY STATEMENT 1. WHEN X>Y IS FALSE AND WHEN XXX IS A STATEMENT, CONTROL PASSES TO THE NEXT SEQUENTIAL LINE, NAMELY LINE N+1. THIS FEATURE IS USED IN LINES 925 AND 940 IN 9PACE1. THAT IS WHY THESE LINES ARE SO LONG.

BEFORE USING THE PROGRAM

PACER REQUIRES A STUDENT RECORD DATA FILE STORED ON THE SYSTEM DISK (DXO). IT MAY BE A NULL FILE. IT ALSO REQUIRES AT LEAST ONE NON-NULL TEXT FILE STORED ON THE SYSTEM DISK.

ABOUT THE STUDENT RECORD FILE

TO CREATE A NULL STUDENT RECORD FILE, A USER XX TYPES THE FOLLOWING COMMANDS, WHERE XX IS THE USERID:

```

SCR
SAVE PACER.DXX

```

ABOUT THE TEXT FILE

( ) INDICATES OPTIONAL EXPRESSION

IO UNLAI IEXT FILES: SELECT A TEXT TO BE READ AND BREAK IT INTO PHRASES. CHOOSE A 1 TO 6 CHARACTER FILENAME FOR THE TEXT, FOR EXAMPLE XXXX. LOG ONTO THE SYSTEM AS A PRIVILEGED USER. TYPE: NEW XXXX.D

TYPE EACH PHRASE OF THE TEXT INTO THE FILE LINE BY LINE.

```

490 ' EACH LINE OF THE TEXT MUST HAVE THE FORM
495 ' N *PHRASE
500 ' WHERE N IS A LINE NUMBER FOLLOWED BY (A SPACE AND) DOUBLE QUOTE
505 ' FOLLOWED BY A PHRASE.
510 ' THE LAST PHRASE OF THE TEXT MUST BE FOLLOWED BY THE LINE
520 ' M *C
530 ' WHERE M IS A LINE NUMBER FOLLOWED BY (SPACE) DOUBLE QUOTE, AND
540 ' LEFT BRACKET.
550 ' THE READING COMPREHENSION QUESTIONS FOLLOW IN THE FORM:
555 ' Q1 *QUESTION
560 ' Q2 *QUESTION CONTINUED?
565 ' Q3 *A. CHOICE 1 B. CHOICE 2 C. CHOICE...
570 ' Q4 *3 D. CHOICE 4 ETC.
575 ' WHERE Q1, Q2, Q3, Q4,... ARE LINE NUMBERS.
580 ' EACH QUESTION MUST BE FOLLOWED BY A LINE OF THE FORM
585 ' R *CX
590 ' WHERE R IS A LINE NUMBER FOLLOWED BY (SPACE) DOUBLE QUOTES,
595 ' LEFT BRACKET, AND X = THE LETTER OF THE CORRECT CHOICE.
600 ' THERE IS NO SPACE BETWEEN C AND X. THE C MARKS THE END OF THE
605 ' QUESTION FOR 9PACE1.
610 ' WHEN THE FILE IS COMPLETE, TYPE:
615 ' SAVE XXXX.D
620 ' STORING IT ON THE SYSTEM DISK. THE TEXT FILE NAME MUST ALSO BE
625 ' ADDED TO THE DATA STATEMENTS IN 9PACER (SEE LINES 1860-1899).
630 ' BE SURE THAT *EOF* IS LAST. SEE THE ACCOMPANYING ANNOTATED
635 ' TEXT FILE, TEXSAM.
640 '
642 '
643 '
650 '
655 '
660 '
665 '
670 '
675 '
680 '
685 '
690 '
692 '
695 '
700 '
705 '
710 '
715 '
720 '
725 '

```

PAGE 3/

TO READ THE STUDENT RECORD FILE

THE FOLLOWING PROGRAM WILL READ A STUDENT DATA FILE FOR USERID XX

```

10 OPEN "PACER.DXX" FOR INPUT AS FILE 1
20 IF END #1 THEN 60
30 INPUT #1, T$
40 PRINT T$
50 GO TO 20
60 CLOSE
70 END

```

IF THE FOLLOWING LINES ARE ADDED, THE ABOVE PROGRAM WILL DELETE THE CONTENTS OF PACER.DXX AND LEAVE A NULL FILE ON THE SYSTEM DISK FOR FUTURE USE.

```

60 KILL "PACER.DXX"
70 OPEN "PACER.DXX" FOR OUTPUT AS FILE 1
80 CLOSE
90 END

```

READY



**Follow the  
RAINBOW  
to the finest  
software  
this side of OZ!**

**MUSIC KALEIDOSCOPE \$15** (Dazzling colors dance to your music.)  
**APPLE '21' \$9.95** (High resolution graphics you won't believe! Needs 24k.)  
**SCREEN MACHINE \$9.95** (Define your own apple character sets. Needs 24k.)  
**RAINBOW CASINO \$35\*** (Practice for Las Vegas. 9 gambling games.)  
**RAINBOW'S POT-OF-GOLD \$49\*** (A buck a program! 49 fun BASIC games.)  
**PHASOR ZAP! \$15** (Top-notch outer space shoot-em-up!)  
**3-D DOCKING \$15** (Dodge the meteorites in 3-D.)  
**ANCIENT TAROT \$15\*** (Readings from this ancient fortune-telling game.)  
**FORTE \$19.95** (Interpretive language for music synthesis.)

### OTHER FAVORITES

Inventory Control . . . . . \$35*	Apple Checkbook . . . . . \$20*
Morse Code Trainer . . . . . \$10*	Speed Reading trainer . . . \$40*
Galactic Battle . . . . . \$15*	Devil's Dungeon . . . . . \$10*
Appletalker . . . . . \$15	Apple Lis'ner . . . . . \$20
Talking Calculator . . . . . \$15	Tic-Tac-Talker . . . . . \$15
Electronic card file . . . . \$20**	Fighter Pilot . . . . . \$9.95
Space Maze . . . . . \$12.95	Microchess 2.0 . . . . . \$20

\* available on disk for an additional \$5. \*\*requires disk

PLEASE ADD \$1.25 FOR SHIPPING AND HANDLING.

Calif. residents add 6% sales tax. NO C.O.D.'S PLEASE. SEND TO:

**Rainbow Computing, Inc.**

10723 White Oak Avenue Dept. CC  
Granada Hills, California 91344

Telephone (213) 360-2171

CIRCLE 123 ON READER SERVICE CARD

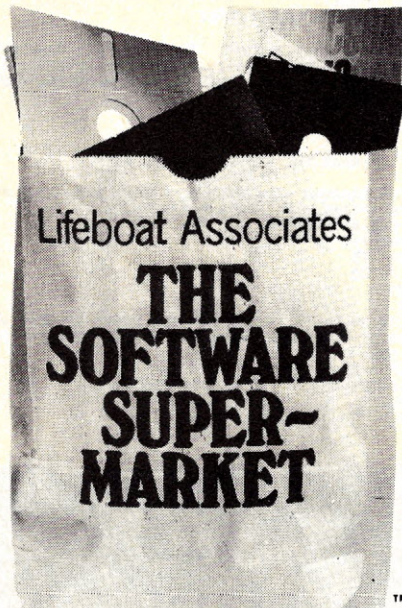


# It's in the bag.

What is?

The biggest and best selection of microcomputer software anywhere. And the list grows bigger every day. CP/M configured for the most popular 8080/Z-80 microcomputer systems and other terrific software, now available. Call or write for our latest literature.

Lifeboat Associates, Suite 506, 164 West 83rd Street  
New York, N.Y. 10024/(212) 580-0082



## 22 START-AT-HOME COMPUTER BUSINESSES

In "The Datasearch Guide to Low Capital,  
Startup Computer Businesses"

CONSULTING • PROGRAMMING • SOFTWARE PACKAGES  
• COM • FREELANCE WRITING • SEMINARS • TAPE/DISC  
CLEANING • FIELD SERVICE • SYSTEMS HOUSES •  
LEASING • SUPPLIES • PUBLISHING • TIME BROKERS •  
HARDWARE DISTRIBUTORS • SALES AGENCIES •  
HEADHUNTING • TEMPORARY SERVICES • USED  
COMPUTERS • FINDER'S FEES • SCRAP COMPONENTS •  
COMPUTER PRODUCTS AND SERVICES FOR THE HOME.  
Plus -- Loads of ideas on moonlighting,  
going full-time, image building, revenue  
building, bidding, contracts, marketing,  
professionalism, and more. No career  
planning tool like it. Order now. If not  
completely satisfied, return within 30  
days for full immediate refund.

• 8½ x 11 ringbound • 156 pp. • \$20.00

Phone Orders 901-362-0172



### DATASEARCH

incorporated

5694 Shelby Oaks Drive Suite 105 Memphis, Tenn. 38134

Rush \_\_\_\_\_ copies of "Low Capital Startup Computer Businesses" to me  
right away.

NAME/COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY/STATE/ZIP \_\_\_\_\_

☐ Check Enclosed ☐ BankAmericard ☐ Master Charge

# \_\_\_\_\_

CIRCLE 101 ON READER SERVICE CARD

9PACER 14-JAN-78 MU BASIC/RT-11 V01-01C

```
1 COMMON N$,A$,T,T1,P
80 REM --- 90-150 WRITE A NEW HEADER IN THE STUDENT RECORD FILE.
82 REM --- FLOPPY DISKS ARE SOMEWHAT SLOW, HENCE LINE 85.
85 PRINT "TIME OUT FOR A FEW SECONDS. PLEASE WAIT."
90 GOSUB 6010
100 PRINT #1 \ PRINT #1
110 PRINT #1,"PACER"
120 PRINT #1
130 PRINT #1,"NAME",TAB(21),"SCORE",TAB(28),"TEXT",TAB(37),"SEC"
140 PRINT #1,TAB(43),"P/L"
150 GOSUB 7010 \ REM --- COMPLETE THE FILE OPERATION.
201 REM --- 210-380 COLLECT INFORMATION (SEE PRINT STATEMENTS)
202 REM --- NEEDED FOR THE REST OF THE PROGRAM.
210 PRINT \ PRINT "DO YOU WANT INSTRUCTIONS?" \ INPUT G$
220 IF SEG$(G$,1,1)="N" THEN 260
225 PRINT \ PRINT
230 PRINT "THIS PROGRAM WILL PRESENT TEXT TO BE READ PHRASE BY PHRASE."
240 PRINT "YOU WILL DECIDE HOW LONG YOU WANT EACH PHRASE TO REMAIN"
250 PRINT "ON THE SCREEN, AND HOW MANY PHRASES YOU WANT PER LINE."
260 PRINT \ PRINT \ PRINT "WHAT IS YOUR NAME?" \ INPUT N$
261 IF N$="" THEN 260 \ REM--NO NULL NAMES
264 REM --- SUBROUTINE 2410 PRINTS NAMES OF EXISTING TEXT FILES.
265 PRINT \ PRINT "TEXT NAMES:" \ GOSUB 2410
268 PRINT \ PRINT
270 PRINT "WHAT IS THE NAME OF THE TEXT YOU WILL READ?"
273 REM --- SUBROUTINE 1810 CHECKS TO SEE IF THE STUDENT REQUESTS AN
274 REM --- EXISTING TEXT FILE.
275 INPUT A$ \ GOSUB 1810 \ REM--VALID TEXT? F=0=NO, F=1=YES.
277 IF F=1 THEN 285
280 PRINT \ PRINT "THERE IS NO SUCH TEXT. "
282 PRINT "DID YOU MAKE A TYPING ERROR?" \ GO TO 270
285 A$=A$+"D"
310 PRINT \ PRINT "HOW MANY SECONDS SHOULD EACH PHRASE REMAIN ON"
320 PRINT "THE SCREEN? ENTER FRACTIONS IN DECIMAL FORM. FOR EXAMPLE,"
330 PRINT "ENTER 1/2 AS .5"
340 INPUT T
342 IF T>10 THEN PRINT "TOO LONG A TIME !!!" \ GO TO 310
343 REM --- T1 IS USED TO TIME THE TEXT.
344 REM --- FOR I=1 TO 475 TIMES APPROX 1 SECOND.
345 T1=475*T
350 PRINT \ PRINT "DO YOU WANT 1 OR 3 PHRASES PER LINE?"
360 INPUT P
370 IF P<>1 THEN IF P<>3 THEN 350
380 PRINT \ PRINT \ PRINT "PLEASE WAIT A MOMENT."
390 CHAIN "9PACE1.B"
1800 REM --- SUBROUTINE 1810-1855 CHECKS TO SEE IF STUDENT REQUESTS
1801 REM --- AN EXISTING TEXT FILE. THE TEXT FILE NAMES ARE STORED IN
1802 REM --- DATA LINES 1860-1899.
1810 READ B$
1820 IF B$="EOF" THEN 1850
1830 IF B$<>A$ THEN 1810
1840 F=1 \ RESTORE \ RETURN
1850 F=0 \ RESTORE \ RETURN
1860 DATA "TEXSAM","PMA","PMB","PMC","PMD","PME","PMF","PMG","PMH","PMI"
1899 DATA "EOF"
2400 REM --- SUBROUTINE 2410-2420 INFORMS STUDENT OF EXISTING
2401 REM --- TEXT FILES. IT USES THE DATA IN LINES 1860-1899.
2410 READ B$ \ IF B$="EOF" THEN RESTORE \ RETURN
2420 PRINT B$, \ GO TO 2410
6000 REM --- SUBROUTINE 6010-6080 DISABLES <CTRL>C INTERRUPT
6001 REM --- AND COPIES ANY EXISTING STUDENT RECORDS INTO A TEMP-
6002 REM --- ORARY OUTPUT FILE. IT LEAVES THE OUTPUT FILE OPEN
6003 REM --- SO THAT THE CALLING PROGRAM CAN UPDATE IT.
6010 PRINT \ C=SYS(8)
6030 OPEN "PACER" FOR INPUT AS FILE #2
6040 OPEN "TEMP" FOR OUTPUT AS FILE #1
6050 IF END #2 THEN 6070
6060 INPUT #2,T$ \ PRINT #1,T$ \ GO TO 6050
6070 CLOSE #2
6080 RETURN
7000 REM --- SUBROUTINE 7010-7040 NAMES THE UPDATED STUDENT RECORDS TO
7002 REM --- THE NAME OF THE STUDENT RECORD FILE, AND REENABLES <CTRL>C.
7010 CLOSE
7020 NAME "TEMP" TO "PACER"
7030 C=SYS(7)
7040 RETURN
9999 END
```

PAGE 5/12

READY

9PACE1 13-JAN-77 MU BASIC/RT-11 V01-01C

```
1 COMMON N$
360 REM --- CHR$(13)=RETURN; CHR$(27)=ESC; CHR$(34)="
366 REM --- A$ CONTAINS THE NAME OF THE TEXT FILE
370 OPEN A$ FOR INPUT AS FILE #1
380 PRINT \ PRINT "WHEN YOU ARE READY, PRESS THE RETURN KEY." \ INPUT
G$
394 REM --- 395 CLEARS THE SCREEN ON A VT52.
395 PRINT CHR$(27);"H";CHR$(27);"J";
396 REM --- P CONTAINS THE NUMBER OF PHRASES PER LINE.
397 REM --- IF P=1, LINES 395-414 PRESENT THE TEXT.
398 REM --- IF P=3, LINES 416-520 PRESENT THE TEXT.
402 IF P=3 THEN 416
403 REM --- T$ CONTAINS THE NEXT PHRASE.
404 INPUT #1,T$
405 REM --- SUBROUTINE 1010 STRIPS OFF THE LINE NUMBER AND " IN T$.
406 GOSUB 1010
407 REM --- THE FIRST OCCURRENCE OF "C" MAKES THE END OF THE TEXT.
408 IF SEG$(T$,1,1)="C" THEN 610
410 PRINT T$;" "
411 REM --- SUBROUTINE 1210 TIMES THE PHRASE.
412 GOSUB 1210
414 PRINT CHR$(13) \ GO TO 395
415 REM --- 416-520 PRESENT 3 PHRASES PER LINE
416 J=0
420 J=J+1
425 REM --- T$ CONTAINS THE NEXT PHRASE.
430 INPUT #1,T$
440 GOSUB 1010 \ REM --- STRIP OFF LINE NO. & " IN T$.
450 IF SEG$(T$,1,1)="C" THEN 610 \ REM --- "C"=END OF TEXT
460 PRINT T$;" "
470 GOSUB 1210 \ REM --- TIME IT
480 IF J<>3 THEN 420
490 PRINT CHR$(13)
501 REM --- 502 CLEARS THE SCREEN ON THE VT52.
502 PRINT CHR$(27);"H";CHR$(27);"J";
520 GO TO 416
```



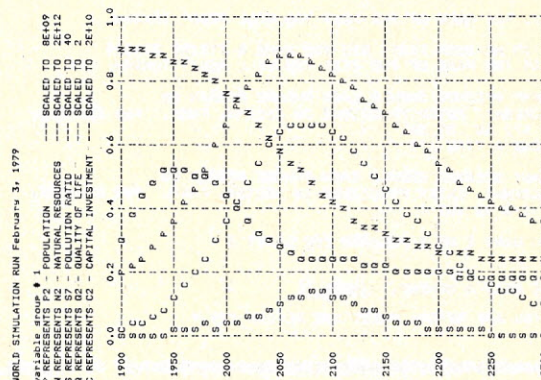
```

600 REM --- 610-670 PRESENT EACH COMPREHENSION QUESTION.
604 REM --- END OF FILE SIGNIFIES THE QUESTIONS ARE FINISHED.
606 REM --- Q COUNTS QUESTIONS; W COUNTS WRONG ANSWERS.
610 Q=0 \ W=0
620 PRINT \ PRINT
630 IF END #1 THEN 810
639 REM --- T$ NOW CONTAINS THE COMPREHENSION QUESTION.
640 INPUT #1,T$
650 GOSUB 1010 \ REM --- STRIP OFF LINE NO. & ".
660 IF SEG$(T$,1,1)="[" THEN 710 \ REM --- "[" MARKS END OF QUEST.
661 REM --- THE CORRECT ANSWER TO THE QUESTION IS THE NEXT CHARACTER
662 REM --- AFTER [ IN THE FILE.
670 PRINT T$ \ GO TO 630
702 REM --- 710-770 WAIT FOR AND EVALUATE THE STUDENT'S ANSWER.
709 REM --- Q COUNTS THE NUMBER OF QUESTIONS.
710 Q=Q+1
720 PRINT "ANSWER ="; \ INPUT G$
729 REM --- IS STUDENT'S RESPONSE CORRECT?
730 IF G$=SEG$(T$,2,2) THEN 760
738 REM --- W COUNTS WRONG RESPONSES. SUBROUTINE 1410
739 REM --- INFORMS STUDENT OF INCORRECT RESPONSE.
740 W=W+1 \ GOSUB 1410
750 GO TO 620
758 REM --- STUDENT'S RESPONSE IS CORRECT. PRAISE HIM IN
759 REM --- SUBROUTINE 2310.
760 GOSUB 2310
770 GO TO 620
810 CLOSE \ PRINT \ PRINT
819 REM --- N$ CONTAINS THE STUDENT'S NAME.
820 PRINT "RESULTS OF THIS SESSION-----";N$;"-----";DAT$
830 PRINT \ PRINT;"TEXT = ";A$
840 PRINT "SECONDS/PHRASE = ";T
850 PRINT "OUT OF ";Q;" QUESTIONS; YOU GOT ";Q-W;" CORRECT."
855 S=INT(100*(Q-W)/Q+.5)
860 PRINT "YOUR SCORE = ";S;"%"
862 PRINT \ PRINT \ PRINT "PLEASE WAIT A MOMENT WHILE YOUR GR
ADE IS RECORDED."
863 REM --- SUBROUTINE 6010 COPIES EXISTING STUDENT RECORDS AND LEAVES
864 REM --- THE FILE OPEN FOR UPDATE.
865 GOSUB 6010
870 PRINT #1,N$;TAB(21);S;TAB(28);A$;TAB(37);T;TAB(43);P
910 GOSUB 7010 \ PRINT \ PRINT
920 PRINT \ PRINT "DO YOU WANT TO RUN THIS PROGRAM AGAIN FOR YOURSELF";
\ INPUT G$
925 IF SEG$(G$,1,1)="Y" THEN PRINT \ PRINT \ PRINT "ONE MOMENT PLEASE.
" \ PRINT \ PRINT \ CHAIN "PACER.B" LINE 265
930 PRINT \ PRINT "DOES SOMEONE ELSE WANT TO USE THIS PROGRAM NOW"; \ I
NPUT G$
940 IF SEG$(G$,1,1)="Y" THEN PRINT \ PRINT \ PRINT "ONE MOMENT PLEASE.
" \ PRINT \ PRINT \ CHAIN "PACER.B" LINE 210
950 PRINT "HOPE YOU LIKED THIS AND FOUND IT HELPFUL."
960 PRINT "BYE FOR NOW."
970 STOP
1000 REM --- SUBROUTINE 1010-1040 STRIPS LINE NUMBER OFF TEXT.
1010 K=0
1020 K=K+1 \ IF K>8 THEN 1030 \ IF SEG$(T$,K,K)<>CHR$(34) THEN 1020
1030 T$=SEG$(T$,K+1,80)
1040 RETURN
1200 REM --- SUBROUTINE 1210 - TIMES THE LENGTH OF TIME EACH PHRASE
1201 REM --- IS ON A SCREEN.
1210 FOR K=1 TO T1 \ NEXT K \ RETURN
1401 REM --- SUBROUTINE 1410-1450 INFORMS STUDENT THAT HE GAVE
1402 REM --- AN INCORRECT RESPONSE.
1410 GOSUB 1610 \ REM --- GET 1ST NAME
1420 PRINT "SORRY, ";F$;" . THAT IS NOT CORRECT."
1430 PRINT "TRY TO CONCENTRATE; AND TAKE YOUR TIME."
1440 PRINT "BETTER LUCK NEXT TIME."
1450 RETURN
1600 REM --- SUBROUTINE 1610-1650 ISOLATES STUDENT'S FIRST NAME.
1610 K=0
1620 K=K+1 \ F$=SEG$(N$,K,K)
1630 IF F$<>" " THEN IF F$<>CHR$(13) THEN 1620
1640 F$=SEG$(N$,1,K-1)
1650 RETURN
2300 REM --- SUBROUTINE 2310-2390 PRAISE CORRECT RESPONSES.
2310 RANDOMIZE
2312 LET X=RND(X)
2314 IF X<.1 THEN 2340 \ IF X<.2 THEN 2345
2315 IF X<.3 THEN 2350 \ IF X<.4 THEN 2355
2320 IF X<.5 THEN 2360 \ IF X<.6 THEN 2365
2325 IF X<.7 THEN 2370 \ IF X<.8 THEN 2375
2330 IF X<.9 THEN 2380
2335 PRINT "GOOD SHOW." \ RETURN
2340 PRINT "YOU'RE REALLY ON TODAY!" \ RETURN
2345 PRINT "I LIKE IT!!" \ RETURN
2350 PRINT "FANTASTIC!!!" \ RETURN
2355 PRINT "YOU GET A GOLD STAR -- *" \ RETURN
2360 PRINT "*****RIGHT*****" \ RETURN
2365 PRINT "*****THAT'S GREAT!*****" \ RETURN
2370 PRINT "YOU DO GOOD WORK." \ RETURN
2375 PRINT "RIGHT ON!" \ RETURN
2380 PRINT "COULDN'T BE RICHTER." \ RETURN
6000 REM --- SUBROUTINE 6010-6080 DISABLES <CTRL>C INTERRUPT
6001 REM --- AND COPIES ANY EXISTING STUDENT RECORDS. IT LEAVES
6002 REM --- THE OUTPUT FILE OPEN SO THAT THE CALLING PROGRAM CAN
6003 REM --- UPDATE IT.
6010 PRINT \ C=SYS(8)
6030 OPEN "PACER" FOR INPUT AS FILE #2
6040 OPEN "TEMP" FOR OUTPUT AS FILE #1
6050 IF END #2 THEN 6070
6060 INPUT #2,T$ \ PRINT #1,T$ \ GO TO 6050
6070 CLOSE #2
6080 RETURN
7000 REM --- SUBROUTINE 7010-7040 NAMES THE UPDATED STUDENT RECORDS TO
7002 REM --- THE NAME OF THE STUDENT RECORD FILE, AND REENABLES <CTRL>C.
7010 CLOSE
7020 NAME "TEMP" TO "PACER"
7030 C=SYS(7)
7040 RETURN
9999 END

```

# WORLD SIMULATION

by James L. Murphy, Ph.D.



A fully interactive ecologic model. Allows manipulation of all system variables. Plots 15 variables in 3 different graphs on any standard printer. Begins in the year 1900 and projects all values at any interval up to selected ending year. Seven variables (Birth Rate, Death Rate, Pollution Ratio, etc.) may be dynamically altered at selected dates within each program run.

All variables and their behavior are fully compatible with Jay W. Forrester's Model WORLD2, as described in *World Dynamics* (Wright-Allen Press, 1971).

Variables graphed:

POPULATION	POLLUTION GENERATED	MATERL STD OF LIV
NAT RESOURC	FOOD RATIO	NAT RESOURC USAGE
POLLUTION RATIO	LIFE EXPECTANCY	CAP INVEST RATIO
QUAL OF LIFE	BIRTH RATE	CAP INVEST RAT. AG.
CAP INVESTMENT	CROWDING RATIO	CAP INV AGRIC FRACT

Two different versions provided on each diskette, both with complete source listings, and manual.

Manual only, with source listings . . . . . \$8.00  
5¼" Diskette-North Star BASIC. . . . . \$28.00  
8" Diskette-CBASIC . . . . . \$32.00

At your computer store, or from

Berkeley Medical Data Associates, Inc.

MICROCOMPUTER CONSULTANTS

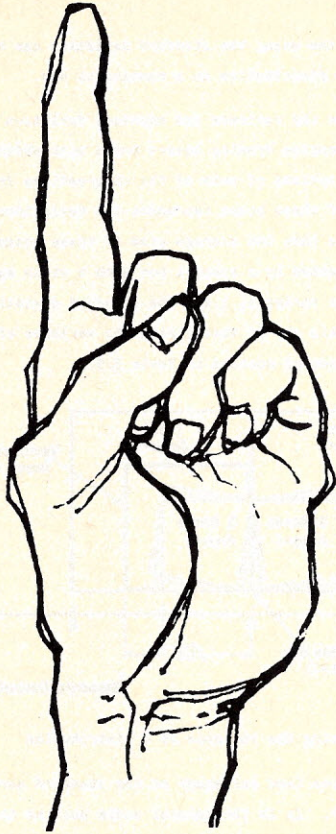
P.O. Box 5279  
Berkeley, California 94705  
(415) 653-6707

CIRCLE 104 ON READER SERVICE CARD



## CREATIVE COMPUTING





A new series of computer-oriented college textbooks is now available. Here's how it came to pass.

## And Then There Was One

A. Kent Morton

Once upon a time, when government agencies had a grand vision for expanding educational technology in our schools, and "NSF" wasn't a dirty word in Congress, a few people realized that, technology or no technology, conventional college courses weren't going to change significantly unless there were texts available to support change.

As a check, they looked around at the publishing field to see if there were any exciting new approaches being offered in chemistry, physics, math, or geography which were based on the growing availability of computing power in the classroom. There were the latest choices among 127 books on programming in FORTRAN (or 43 in BASIC); 11 brand new, glossy entries into the introductory biology market (beautiful overlays, but no technology); and a vast array of technical material for people turned on by nuts and bolts, data base design, computer design, and hardware communications. But, alas, nothing for the teacher who wants to show his students how computing can help convey the subject matter in his course.

Frustrated, but not at all surprised, they decided to write a proposal for the creation of an organization that would sponsor the production of new teaching materials supporting the use of computing. These materials were not to be CAI programs, but ink on paper, in the form commonly known as a textbook or monograph. They believed they knew how they could lay their hands on some promising material for this venture.

After the canonical number of site visits and revisions, the proposed organization was funded by the National Science Foundation at Dartmouth College in 1971 and took the name of COMPUTE — Computer Oriented Materials Production for Undergraduate Teaching.

COMPUTE's first task was to identify individuals nationwide who had already developed high-quality computer-oriented instructional material for courses at

### Correlation

```

IPSB.11
100 REM PROGRAM IPSB.11
110 REM THIS PROGRAM COMPUTES THE CORRELATION BETWEEN TWO VARIABLES. THE
120 REM INPUT IS IN DATA STATEMENTS. THE FIRST NUMBER IS THE NUMBER OF
130 REM PAIRS. THIS IS FOLLOWED BY A LIST OF THE FIRST NUMBERS IN THE
140 REM PAIRS AND THEN BY A LIST OF THE SECOND NUMBERS IN THE PAIRS.
150 REM
160 REM *****
170 DIM X(100),Y(100) REM MAX NUMBER OF PAIRS IS 100
180 REM
190 READ N REM READ NUMBER OF PAIRS
200 REM
210 REM INITIALIZE COUNTERS
220 LET X1=0
230 LET X2=0
240 LET Y1=0
250 LET Y2=0
260 LET P=0
270 REM
280 FOR I=1 TO N REM READ FIRST NUMBERS
290 READ X(I)
300 NEXT I
310 REM
320 FOR I=1 TO N REM READ SECOND NUMBERS
330 READ Y(I)
340 NEXT I
350 REM
360 FOR I=1 TO N REM CUMULATE SUMS
370 LET X1=X1+X(I)
380 LET X2=X2+X(I)*X(I)
390 LET Y1=Y1+Y(I)
400 LET Y2=Y2+Y(I)*Y(I)
410 LET P=P+X(I)*Y(I)
420 NEXT I
430 REM
440 LET R1=N*P-X1*Y1 REM COMPUTE R
450 LET R2=SQR((N*X2-X1^2)*(N*Y2-Y1^2))
460 LET R=R1/R2
470 PRINT "CORRELATION IS",R
480 PRINT
490 REM
500 DATA 5 REM DATA FOLLOWS
510 DATA 3,5,7,5,8
520 DATA 4,8,6,7,1
530 END
  
```

```

IPSB.11
CORRELATION IS -0.397467
  
```

Figure 8.11 A list and run of a BASIC program that computes  $r$  using the computational formula

A sample program for *Elementary Psychological Statics* by Price.



their own institutions. This was done largely on the basis of an open call for proposals, repeated annually, whereby COMPUTe acted much like a mini funding agency. To the authors of those materials which were favorably reviewed by others, COMPUTe offered the necessary incentives and resources to polish those materials into products useful to others in addition to themselves.

The normal incentive package included two months of salary and housing at Dartmouth (in the summer!), plus a royalty on each sale of the final product. Authors were also treated to all the editorial, programming, artistic, and secretarial support which their texts might require (and some required considerable!). Finally, since this was intended to be a seed effort only, COMPUTe committed itself to finding a commercial outlet for all these products on behalf of the authors, with the expectation that usual commercial incentives and mechanisms would then take over in this new field.

After more than four years of negotiations with several publishers, Dartmouth College signed an exclusive contract in June 1978 with COMPRESS, Inc., whose acronym stands for Computer Oriented Materials Press. COMPRESS President Thomas L. Sears has been involved in college textbook publishing for over twenty years.

In addition to the 24 titles produced by COMPUTe, COMPRESS has contracts for another book on mechanics and for five books produced by Project SABLE (Systematic Approaches to Biological Laboratory Explorations) at Berkeley. Areas covered by these 30 texts include various topics in biology, environmental studies, geology, geography, urban planning, mathematics and statistics, logic, physics, psychology, and chemistry. Sample pages from some of these texts appear with this article.

It is of course difficult to get much of a feeling from these samples for the kind of material that has been developed and is now available for classroom use. The model, however, is the traditional textbook format for similar subject matter. With a few exceptions which could be classified as either laboratory or tutorial material, these books tend to present the subject matter in a descriptive manner from the viewpoint of a teacher explaining the subject to a student. There are three principal components: narrative text, worked examples, and homework problems. These are woven together in suitable fashion, with the role of the computer emphasized in all three areas as appropriate. The major emphasis is always on the pedagogy involved and the role the computer plays in supporting that pedagogy, rather than on programs for their own sake. Few of the texts make any attempt to teach any programming whatsoever; those that do include some programming information strive to distribute it in a way which is supportive of the material being taught in a given chapter.

But what about the programs themselves? Is there any assurance that they will run on machines other than those for which they were developed? Happily, yes. Historically, COMPUTe was conceived and born at roughly the same time as CONDUIT, and the two efforts were intentionally kept separate in order that they might concentrate on different factors affecting the widespread use of computing in instruction. CONDUIT, which initially focused on identifying and overcoming technical barriers to transportability, had one of its five original offices about 50' away from the COMPUTe office at Dartmouth. From the outset, the export sets prepared to accompany the COMPUTe instructional material were designed in conformance with the guidelines developed by CONDUIT. Some were actually prepared by CONDUIT staff. Over the years, a close working relationship has been maintained between COMPUTe and CONDUIT to help

#### Descriptive Statistics

a set of numbers. Like the mean, the standard deviation can be marked on the scale of a distribution in a meaningful way.

One way to visualize the variance and standard deviation of a set of numbers is to imagine drawing square boxes with widths corresponding to the deviations of each of the observations from their mean. The areas of these boxes represent the deviations squared. The variance is then the average area of these boxes and can itself be represented by a special box with a width equal to the square root of the variance, i.e., the standard deviation. Figure 3.8 illustrates this way of visualizing the variance of a distribution, using the set of numbers in Table 3.9.

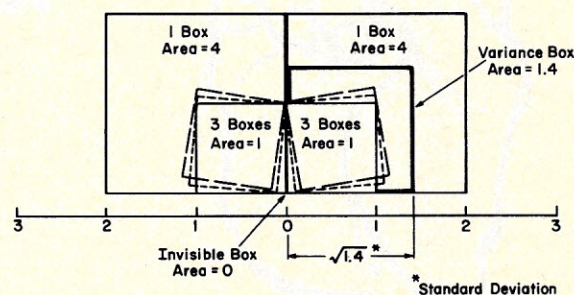


Figure 3.8 Visualizing the variance of a distribution

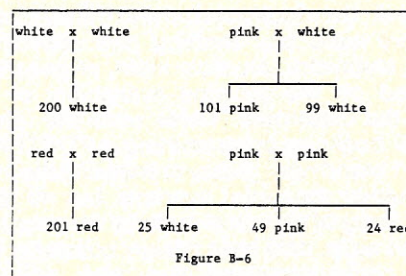
The standard deviation (and variance) of the standard normal distribution is exactly 1. It is the natural scale unit of the standard normal distribution. Recall that approximately 2/3 of

From *Elementary Psychological Statistics* by Price.

(If you have difficulty, review frame A-14 for a summary of the problem solving strategy.)

Check answer b-15

- Examine the results of the following matings. Then diagnose the trait "flower color" in snapdragons.



(If you have difficulty, review frame B-4.)

Check answer b-18

#### B-9 PROBLEMS

If you have access to the computer simulated laboratory GENIE, work through any problems your instructor has assigned at this point. Problems are provided for classes without GENIE and for students who wish added practice in solving problems.

Problem B1—Traits in the vobble

Phenotypes found in sample:

Male	Female	Phenotype
yes	yes	1) small wings
yes	yes	2) large wings

Sample page from *Mendelian Genetics* by von Blum and Hursh.



ensure the transportability of programs.

Recognizing the importance of quality software and timely distribution of same to the success of its published material, COMPRESS, Inc., has entered into a working agreement with CONDUIT for distribution of software to accompany its texts. For the convenience of the user, however, software as well as texts may be ordered directly from COMPRESS. The idea is to make it as simple as possible.

#### Elementary Computational Physics

Figure 4.10 A plot of the motion of three bodies with the initial conditions of Exercise 4.7. All of the motion is clockwise.

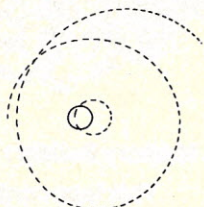


Figure 4.11 At later times the two large masses are not noticeably influenced by the smaller mass. They follow elliptical paths like those shown in Figures 4.7-4.9. But the orbit of the small mass does not close on itself.

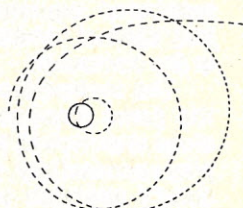


Figure 4.12 As the orbits evolve, that of the small mass is noticeably unstable. Eventually the "planet" will encounter one of the stars (or both) in a close approach that will give it positive energy with respect to the binary pair and it will escape from the system. (In real circumstances it could crash into the surface of one of the stars.)

An illustration of the three-body problem from *Elementary Computational Physics* by Bolemon.

COMPRESS began production of its first eleven titles in February in order to compete in the peak text promotion period this spring. The current list includes *Mendelian Genetics*, *Population Growth*, *Graphical Mechanics*, *Physics Tutorial Problem Workbook*, *Survey Sampling in the Environmental Sciences*, *Computer Exercises for Elementary Statistics*, *Descriptive Statistics*, *Introductory Psychological Statistics*, *Cognitive Psychology*, *Optimal Location of Facilities*, and *A Manual for BERTIE* (logic). These are paper editions in a 5½" x 8½" trim size. Those who wish to see firsthand the products being offered should write COMPRESS at P.O. Box 102, Wentworth NH 03282. COMPRESS materials will also be on exhibit at the National Educational Computing Conference in Iowa City in June. Other plans include developing microcomputer versions of as many of the packages as is feasible and developing new titles for future markets. Manuscripts are welcomed for this purpose.

\*\*\* The Beginning \*\*\*

#### Author note

In addition to managing the COMPUTE project for seven years, the author has been chairman, secretary-treasurer, and editor for the ACM Special Interest Group for Computer Uses in Education. He is now serving as a consultant to COMPRESS, Inc., and to the ANSI committee for the standardization of the BASIC programming language. Occasionally he writes a new proposal.

MAY 1979

#### RADIO SHACK COMPUTER OWNERS

# TRS-80 MONTHLY NEWSLETTER

- PRACTICAL APPLICATIONS
- BUSINESS
- GAMBLING • GAMES
- EDUCATION
- PERSONAL FINANCE
- BEGINNER'S CORNER
- NEW PRODUCTS
- SOFTWARE EXCHANGE
- MARKET PLACE
- QUESTIONS AND ANSWERS
- PROGRAM PRINTOUTS
- .... AND MORE

↙ FREE \* ↘

WORD PROCESSING PROGRAM (Cassette or Disk)  
For Writing Letters, Text, Mailing Lists, Files, Etc.  
With Each New Subscription Or Renewal

**COMPUTRONICS** INC.  
MATHEMATICAL APPLICATIONS SERVICE™

Box 149

New City, New York 10956

✓ M64



**24** HOUR  
ORDER  
LINE  
(914) 425-1535



ONE YEAR SUBSCRIPTION \$24 \_\_\_\_\_

TWO YEAR SUBSCRIPTION \$48 \_\_\_\_\_

SAMPLE OF LATEST ISSUE \$4 \_\_\_\_\_

START MY SUBSCRIPTION WITH ISSUE \_\_\_\_\_  
(#1 - July 1978 • #7 - January 1979)

NEW SUBSCRIPTION \_\_\_\_\_ RENEWAL \_\_\_\_\_

CREDIT CARD NUMBER \_\_\_\_\_ EXP. DATE \_\_\_\_\_

SIGNATURE \_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

**SEND FOR FREE SOFTWARE CATALOG (INCLUDING LISTINGS OF HUNDREDS OF TRS-80 PROGRAMS AVAILABLE ON CASSETTE AND DISKETTE).**

\* This offer valid on orders placed after Dec. 1, 1978

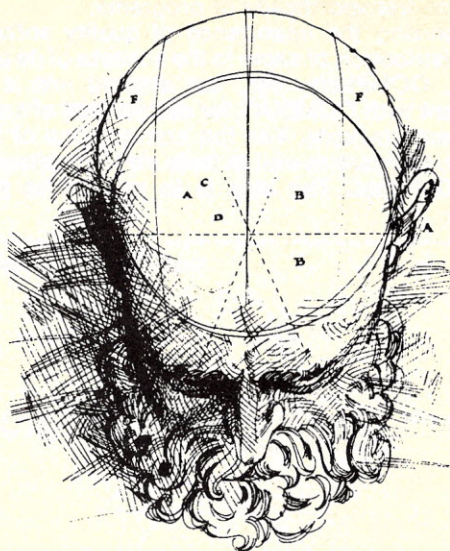
CIRCLE 141 ON READER SERVICE CARD





# PDI IQ Builder Software

Randy Heuer



Program Design Incorporated, also known as PDI, has released a series of educational software packages for the PET and APPLE computers. Each package retails for \$9.95 and contains between four and twelve programs. We reviewed three tapes for the PET and two for the APPLE, although others are available.

Before specifically reviewing each tape, I'd like to comment on the physical quality of the software package. Each is packaged in a 6½ x 11" clear plastic bag stapled closed with a cardboard sealer labeled PET or APPLE. If a hole were punched in the sealer, the package could be hung on a pegboard-type retail display.

Inside, the software cassette is packaged in a soft cassette box. Occupying the remainder of the bag is a four or eight page, 5½" x 8½" instruction booklet. The booklet explains the concepts behind each exercise and instructions on how best to use the package.

Overall, then, the physical design of the software package is excellent, providing the retailer with a highly visible display, and the purchaser with a substantial amount of product for his money.

## PET SOFTWARE

### Preschool IQ Builder

As the title suggests, this package is designed for preschool children. One side of the tape contains six lessons entitled "Same and Different." In these exercises the child is confronted with two shapes side by side and must determine whether they are the same or not. The child then presses the "S" key if they are the same, or the "D" key if they are different. A variety of shapes is used

from geometric figures to letters.

Since very young children may have trouble discerning the letters "S" and "D," the instruction booklet suggests that a smiling face sticker be placed over the "S" key and a frowning face be placed over the "D" key. It is also suggested that the remainder of the keyboard be masked off with cardboard.

The other side of the tape contains six programs of the "Letter Builder" series. Each program shows the child a letter and requires the child to press the same letter on the keyboard. The first lesson starts with only two letters and by lesson 6 all the letters are used.

In both the "Same and Different" and "Letter Builder" series, two rows of stars will appear on the screen when the child answers correctly. The computer will then proceed to the next problem.

An incorrect response has no visible effect. This is a bit unfortunate, as the child is not informed that he has made the wrong choice. Every time the child presses the wrong key, his total wrong is increased by one. Thus, if the child continues to press the wrong key by accident or in frustration, this is credited against his total. This is a minor flaw, but one that could easily be corrected.

At any time during the program, the parent or teacher can stop and review the child's progress. The program also advises the parent whether to have the child move on to the next program in the series, or to continue with the same program.

Overall, this software package appears to offer the preschooler a large number of sequential exercises along with the opportunity for him to "run" his own computer.

### Memory Builder: Concentration

This tape contains four versions of a game similar to the TV game show "Concentration." The object is to find ten matching pairs of letters or words hidden behind a board of twenty numbered squares. The child may play against himself, another person, or the computer.

The instruction booklet says that the game requires the child to pay close attention to the board in order to play successfully, thus increasing the child's attention span and ability to concentrate. It is suitable for children ages six and older.

The four versions of the game are similar in play, but vary the types of objects hidden behind the numbered squares. In the first two versions, single letters are used. The third version uses three-letter words and the final version uses four-letter words (don't worry, they're not dirty).

The game is fun to play and is different each time played. The two-player version can also be an excellent parent-child activity.

### Vocabulary Builder 2: IQ Builder

This software package is designed for older children, probably early high school age or older. It consists of ten programs (lessons). The first five lessons test knowledge of synonyms; the last five lessons involve finding antonyms.

Each lesson contains forty problems presented in a multiple choice format. You are given a word and asked to choose the word most similar to or most nearly opposite the given word from a list of five other words. When the student chooses the correct answer, the program proceeds to the next problem. A wrong answer



requires that the student attempt the same question again. The student may stop at any time to evaluate his progress.

The forty words in each lesson are presented in the same order each time. However with a total of 400 words in the ten lessons, it would be difficult to memorize the answers without actually learning the meanings of the words. It may not be particularly fun to play, but this package offers good practice to those wishing to extend their vocabulary or to prepare for the SAT examination or similar tests.

## APPLE SOFTWARE

### Number Series: IQ Builder

This nine-program package tests your ability to solve number series problems. The first program is a brief introduction to number series problems and how you should approach solving them. The remaining seven lessons and a quiz are devoted to finding the next two numbers of a number series. Twenty-five problems are presented in each lesson. You get three tries at each problem. If you fail to answer correctly after two tries, a hint is provided before your last attempt. Thus if you are stumped, you

can usually solve the series after receiving the hint.

The use of the speaker in the APPLE is also a nice touch. By lesson 8, the series can be quite difficult even for number series "experts." Still, if you like problems of this type, this package with its 200 problems can be most enjoyable.

### Analogies: IQ Builder

This is my favorite of all of the software from PDI. It consists of six lessons and a quiz that requires you to decipher and interpret analogies.

The first two lessons each contain thirty analogies that the student must interpret and determine how the two subjects are related. The student then chooses an analogy type that best describes the given analogy. Five possible answers are provided.

In the third lesson, the student is given an analogy, followed by a second incomplete analogy. The student then chooses from a list of five possible choices to complete the analogy. The program will give you two hints, if you cannot get the correct answer on the first try.

The final three lessons consist of problems in which the student is given one analogy and then must select a similar analogy from a list of

five possible choices. Once again, hints are provided if you fail to get the correct answer on the first try. A final quiz is given in which the student must also select an analogy which is most like the one given. During the quiz, however, no hints are given.

Overall, this is the best of the PDI software line. The variety of different types of lessons helps keep the student's interest in the exercises. Use of the APPLE's speaker also helps to make the program more user oriented.

### The Wrap-Up

Although I reviewed only five of the PDI software packages, others are available. In addition, several of the packages are available for other computers, including the TRS-80. Check PDI's latest ads to see which tapes are available for your machine.

In general, the educational programs from PDI stress repetitive exercises for the development of language and mathematic skills. This approach allows PDI to provide a large number of exercises per software package, thereby giving the customer good value for his software dollar.

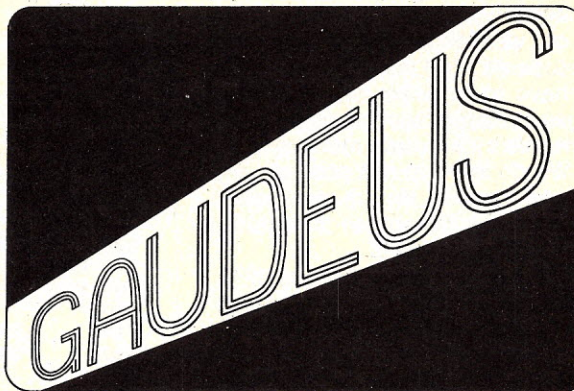
For more information write Program Design, Inc., Dept. 401, 11 Idar Court, Greenwich, CT 06830. □

**PET  
TRS-80  
APPLE II  
SORCERER\***

**Eventually all other micros**

**30¢ PER PROGRAM?**

8 K Bytes  
Minimum  
Needed



Gaudeus is a monthly cassette tape with at least ten programs each month with such topics as Home Economics — Business — Trivia — Games — Language (Computer) — also programs in Math, Physics, Geography, Chemistry, Recipes, Nutrition, Speed Reading, Buzz Phrase Generator and much more. The back of the cassette, besides having recipes, tables or charts, will also have short stories and editorials with speed control so you can train speed reading.

The introductory price is \$30.00 per year.

\*our previous preintroductory price of \$25.00, plus an extra C-30 cassette has been extended for Sorcerer owners to May 15, 1979.

**GAUDEUS, Box 113, Ozone Park, N.Y. 11417**

CIRCLE 153 ON READER SERVICE CARD



# How To Hide Your Basic Program

## Round 2

Robert S. Jaquiss, Sr.

*This article is a follow-up to the article "How to Hide Your Basic Program" by John M. Nevison which appeared in the January 1979 issue of Creative Computing.*

I agree with many of the concepts that Nevison is trying to preach in this sarcastic article. Since Nevison has been programming for 13 years, he has undoubtedly observed the (recent) development of STYLE in regard to BASIC. He is also probably aware that a program written in the style of his first example uses much memory—more memory than I have had until recently. Until three years ago I was limited to about 1500 characters for a program. Programming in FOCAL, one of my students was able to write a program to solve 9 simultaneous linear equations; using little text and, of course, no remarks.

When my school got a computer that had a larger workspace, I also began to insist on well-documented programs from students (and myself). We sometimes have to un-learn our cherished primitive concepts such as using every conceivable trick to save memory locations. We do learn to use prompts and labels and remarks, etc., in my classes. Once in a while the phrase "structured programming" is heard.

Mr. Nevison's program line 130 REM, suggests that the program is 'especially good for batches of less than 50'. Good thing since B will later be dimensioned at 38. He might have suggested 38 or fewer numbers.

Line 180. L is also an index variable as I is in line 170.

Line 220 (LET N9=38) is a nice touch. This may make it easier to change the number of numbers to be sorted; or should that be the number of positive integers less than 26 to be sorted? I don't understand why N9 is chosen as a variable. Why not N7 or even just plain N? Also why 38? DIMension B(50).

Line 270 (REM MAIN PROGRAM) is hardly necessary since there appears to be no program other than the MAIN PROGRAM.

Robert S. Jaquiss, Sr. Instructor, Computer Science, North Salem High School, Salem, Oregon 97301 and Instructor, Computer Science, Willamette University.

Line 290 REM READ IN N9 RANDOM NUMBERS, SORT THEM,  
Line 300 REM AND PRINT THEM OUT.

These REMarks are of less than no significance, they are of negative value. The whole program does these things. "SORT THEM" would be better placed just prior to line 380, whereafter the sorting is done.

"PRINT THEM OUT" would be more

appropriate before line 480 where the results are about to be printed.

The REMark "READ IN N9 RANDOM NUMBERS" is confusing to me. "READ" is a reserved word in BASIC and means READ-DATA, or read a file (INPUT). Perhaps one could generate a list of RANDOM NUMBERS.

Line 315 (LET X=0) is not necessary at all, since a value will be assigned to X in line 410. In some cases, a variable should be initialized — at the beginning of the program — or just prior to where it is to be used (line 370). In this case, X should not be initialized any more than I, or L, which are assigned in the FOR-NEXT loops.

Lines 110, 140, 440: I have never used a BASIC that allowed a line number all by itself this way. Thus line 400 (IF-THEN 440) would not execute in any BASIC I know because there would not be a line 440 to go to.

(Mr. Nevison, If one of my students

```

100 REM      SORT              16 SEPTEMBER 1977      JOHN M. NEVISON
110
120 REM      SORTS A MIXED BATCH OF NUMBERS, B(), INTO ASCENDING
130 REM      ORDER.  ESPECIALLY GOOD FOR BATCHES OF LESS THAN 50.
140
142 REM      REFERENCE:  JOHN M. NEVISON, "THE LITTLE BOOK OF BASIC
144 REM      STYLE:  HOW TO WRITE A PROGRAM YOU CAN READ,"
146 REM      READING, MASS:  ADDISON-WESLEY PUBLISHING
147 REM      COMPANY, 1978.
148
150 REM      VARIABLES:
160 REM      B()...THE BATCH OF NUMBERS
170 REM      I.....THE INDEX VARIABLE
180 REM      L.....THE LENGTH OF THE CURRENT LIST
190 REM      X.....THE EXCHANGE VARIABLE
200
210 REM      CONSTANT:
220      LET N9 = 38              'NUMBER OF DATA
230
240 REM      DIMENSIONS:
250      DIM B(38)
260
270 REM      MAIN PROGRAM
280
290 REM      READ IN N9 RANDOM NUMBERS, SORT THEM,
300 REM      AND PRINT THEM OUT.
310
315      LET X = 0
320      FOR I = 1 TO N9
330          LET B(I) = INT(RND*25 + 1)
340          PRINT B(I);
350      NEXT I
360      PRINT
366      PRINT
370
380      FOR L = N9 TO 2 STEP -1
390          FOR I = 1 TO L-1
400              IF B(I) >= B(L) THEN 440
410                  LET X = B(I)
420                  LET B(I) = B(L)
430                  LET B(L) = X
440
450          NEXT I
460      NEXT L
470
480      FOR I = 1 TO N9
490          PRINT B(I);
500      NEXT I
510      PRINT
520
530      END

```



handed in this program I would return it for revision. But, I have some high standards.)

The downhill development of the remainder of the article make a number of good (or shall we say bad) points. Under point 3 (Strain the Reader's Eye) Mr. Nevison could have mentioned using no line number ending with zero.

There are a few more points I would like to add to the list of ways to do it all wrong.

#### 5th Downhill Concept.

Another downhill step that Nevison missed is the vile practice of multiple statements per line. In keeping with the 'how not to do it' teaching philosophy, I have prepared a worse program for illustrative purposes (Program SRT100). It is easier to write badly than goodly anyway. I used the same line numbering as Nevison as far as possible. Since I wanted to display a RUN of the program, I did make a few changes, such as printing the numbers on one line. One line of 38 numbers is too long,

```
200 REM PROGRAM TO SORT NUMBERS
220 N=38\DIMB(50)\I=0
320 I=I+1\B(I)=INT(RND(X)*10*N)+1
340 PRINTB(I);\IFINT(I/5)=I/5 THEN 990
350 IF I<N THEN 320
360 PRINT\PRINT\L=N+1
380 L=L-1\I=0\X=0
400 I=I+1\IFB(I)<=B(L) THEN 440
420 X=B(I)\B(I)=B(L)\B(L)=X
440 IF I<L-1 THEN 400
450 PRINTB(L);
455 IFINT((N-L+1)/5)=(N-L+1)/5 THEN 980
460 IF L>2 THEN 380
470 GOTO 500
480 PRINT B(L);
500 L=L-1\IF L>0 THEN 480
590 PRINT
600 PRINT\FOR I=1 TO N STEP 5
610 FOR J=0 TO 4
620 IF I+J>N THEN 999
630 PRINTB(I+J);
640 NEXT J\PRINT\NEXT I
980 PRINT\GOTO 460
990 PRINT\GOTO 350
999 PRINT\PRINT\END
```

READY  
RUN

```
138 127 241 134 255
206 323 10 206 356
48 148 371 197 177
168 369 109 330 68
202 93 127 230 248
148 327 273 128 274
171 197 221 91 39
3 148 360
```

```
371 369 360 356 330
327 323 274 273 255
248 241 230 221 206
206 202 197 197 177
171 168 148 148 148
138 134 128 127 127
109 93 91 68 48
39 10 3
```

```
3 10 39 48 68
91 93 109 127 127
128 134 138 148 148
148 168 171 177 197
197 202 206 206 221
230 241 248 255 273
274 323 327 330 356
360 369 371
```

so I asked the computer to print 5 numbers to a line. This addition paid unexpected dividends in helping to further obscure the program as I was able to insert several GOTO's.

Let us examine the program LISTING. We begin with a statement of program purpose: to sort numbers. No mention is made of what numbers, how many numbers, or ascending or descending order. Some FOR-NEXT loops have been deleted and others added. I really did try to eliminate all the spaces but the spacing habit is too strong.

I submit that the logic is contorted. The multiple statements per line make the program listing much more difficult to read. The addition of subtle changes such as RND(X)\*10\*N make for more confusion than just RND\*25. Surely it is not clear that in line 340 the jump to 990 terminates a line of five integers.

It may seem peculiar that in line 360 L=N+1 and on the next line, line 380, L=L+1. Line 455 was previously included in line 450 (which I thought more confusing) but the line was considered too long for publication.

I do not have a book to sell. But let's hear it for Bob. Isn't my program worse than Nevison's?

#### 6th Make it worse concept:

Document the program in a misleading manner.

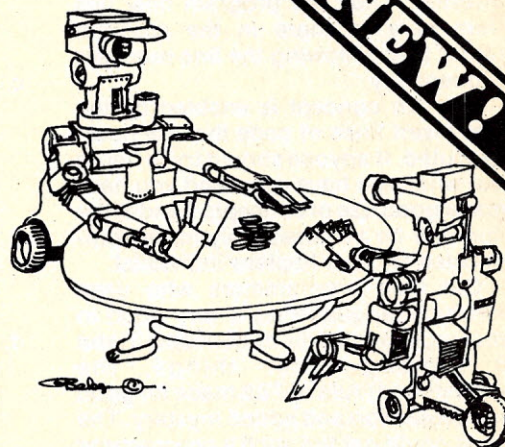
My second program (SRT300) is the

same as my first program with a few additions. First, the interactive user is told the program purpose (this program sorts numbers) in an ambiguous manner. The user may assume whatever s/he likes. The next printed output follows immediately, before the user has time to contemplate, "HOW MANY NUMBERS TO SORT?"

If the user wants to sort more than 50 numbers the program will malfunction (DIM B(50)). So the user is told the computer is 'too tired to sort that many numbers.' If the user asks to sort fewer than 4 numbers the message "TRIVIAL. DO IT YOURSELF." is printed. This nasty was added because the computer will accept input numbers only until three fewer numbers than the specified number have been typed in (line 150).

In the example RUNs several numbers were typed in on one line to conserve space. Imagine the user who expects to type in 10 numbers. As soon as the seventh number is typed the computer starts printing out numbers. What numbers? Not the numbers the user typed in, but some numbers the computer made up. The specified number of numbers is displayed in random order, descending order, and ascending order. In addition, if the specified N is a multiple of 5, the program falls through a crack and starts again at the beginning.

## More Basic Computer Games



Our fabulous new book, **More Basic Computer Games**, brings you 90 brand new games in Basic, ready to run on your computer. Some have been published in Creative Computing magazine but most are completely new!

Includes space games like Close Encounters, Deepspace and ICBM. Or match wits with Lewis Carroll, evade a man-eating rabbit, become a millionaire, race your Ferrari, play a tennis match, throw mud pies at a schmoo (who throws back), crack a safe, joust with the evil black knight, or trek across the desert on your camel.

**More Basic Computer Games** has complete listings and sample runs in large type, along with thorough descriptions of every game. Large format paperbound, 192 pages. \$7.50 plus \$1.00 shipping and handling in U.S. (\$2.00 foreign). NJ residents add 5% sales tax. Send your order and payment to Creative Computing, P.O. Box 789-M, Morristown, NJ 07960. Visa, MasterCard and American Express okay. For faster service, call in your bankcard order to:

**800-631-8112**

(In NJ, call 201-540-0445)



```

90DIMB(50)\RANDOMIZE
100PRINT"THIS PROGRAM SORTS NUMBERS."
110PRINT"HOW MANY NUMBERS TO SORT?"
120INPUTN\IFN>50THEN800
125IFN<4THEN850
130PRINT"TYPE IN THE NUMBERS TO BE SORTED."
140PRINT"PRESS 'CARRIAGE RETURN'";
145PRINT"AFTER EACH NUMBER."
150FORI=1TON-3\INPUTB(I)\NEXTI\I=0
320I=I+1\B(I)=INT(RND(X)*10*N)+1
340PRINTB(I);\IFINT(I/5)=I/5THEN990
350IFI<NTHEN320
360PRINT\PRINT\L=N+1
380L=L-1\I=0\X=0
400I=I+1\IFB(I)<=B(L)THEN 440
420X=B(I)\B(I)=B(L)\B(L)=X
440IFI<L-1THEN400
450PRINTB(L);
455IFINT((N-L+1)/5)=(N-L+1)/5THEN980
460IFL>2THEN380
470GOTO500
480PRINTB(L);
500L=L-1\IFL>0THEN480
590PRINT
600PRINT\FORI=1TONSTEP5
610FORJ=0TOD4
620IFI+J>NTHEN999
630PRINTB(I+J);
640NEXTJ\PRINT\NEXTI
650GOTO100
800PRINT"I AM TOO TIRED TO SORT";N;"NUMBERS."
810GOTO110
850PRINT"TRIVIAL.      DOIT YOURSELF"
860GOTO810
980PRINT\GOTO460
990PRINT\GOTO350
999PRINT\PRINT\END

```

```

THIS PROGRAM SORTS NUMBERS.
HOW MANY NUMBERS TO SORT?15
TYPE IN THE NUMBERS TO BE SORTED.
PRESS 'CARRIAGE RETURN' AFTER EACH NUMBER.
?12,34,56,78,5,4
?678,234
?34567
?567
?345
?76543

```

```

44 45 102 116 67
44 148 147 100 145
129 56 141 50 44

```

```

148 147 145 141 129
116 102 100 67 56
50 45 44 44 44

```

```

44 44 44 45 50
56 67 100 102 116
129 141 145 147 148

```

```

THIS PROGRAM SORTS NUMBERS.
HOW MANY NUMBERS TO SORT?13
TYPE IN THE NUMBERS TO BE SORTED.
PRESS 'CARRIAGE RETURN' AFTER EACH NUMBER.
?1,2,3,4,5,6,7,8,9
?78

```

```

125 37 50 37 95
89 16 110 89 19
71 126 108

```

```

126 125 110 108 95
89 89 71 50 37
37 19 16

```

```

16 19 37 37 50
71 89 89 95 108
110 125 126

```

#### 7th and 8th make it worse concepts.

A program LIST illustration is not provided. The 7th concept is to rearrange the lines of the program flow so that many unnecessary GOTOs are inserted. Thus the program flow flits from here to there in the program rather than following the line numbers sequentially.

The 8th concept is enabled by the 7th. Insert lines of code that are never executed. If anyone should try to figure out what you have done and you have made good use of concepts 7 and 8, the task will be immeasurably more complicated for that hapless individual.

Old time programmers who used machine language were very good in the implementation of concepts 7 and 8. Among other things, the (priesthood) rule of 7&8 made for good job protection and added mystery. The boss could not fire such a programmer because no one else would be able to maintain the programs.

#### Concept 9.

Concept 9 is really not a programming concept, but has to do with the dissemination of computer programs. Here are a number of ideas that can be used singly or in combination.

- If you use a teleprinter, make sure that the ribbon is old and the type head is out of alignment before you prepare a printout for publication.
- If you are the publisher, make liberal use of a copier that reduces print size. If the print size is reduced by half, four times, the

print will be one-sixteenth the original size and more letters will fit on a page. The fact that (a) combined with (b) will surely make it impossible for anyone over 30 years of age to read the article is not important. People over 30 are not important anyway.

- If there is any possibility that (a) and (b) might not make an article completely unreadable, another add-on possibility is to print gray ink on a gray background, or try green ink on a blue background, or pink on red. Not only is the article now unreadable, it will also be difficult to make a copy of the article on a copier.
- Some publishers are very adept at overexposure of copy on the copy machine or the use of too much ink. Either of these tricks make the characters bleed out in unexpected and wildly unreadable ways.
- Don't publish the last page of the program LISTing.

On the other hand, there are many attributes of good programming style that should be mentioned early on in teaching programming in any computer language. It is much more difficult to write about good programming practice than to poke fun at another's serious attempt to produce a good program. Let us resolve to think positively about programming; to emphasize good programming practices.

The first few lines of a program should identify the program, by name, if it has a name on a storage device. The programmer should be identified. If the program is a student assignment, the problem should be identified by name, page, problem number, etc. If the program is not original, credit should be given where credit is due.

Next should be a brief explanation of the program purpose and directions to use the program. All variables should be identified at the beginning and initialized, dimensioned or declared as needed. Some persons take pride in boxing in these (and other) program segments with rows of stars.

Certainly some attention should be given to having a main program and subprograms, subroutines or procedures. Of course, the subprograms should be set off in printed format, identified, and pass-to, pass-back parameters clearly stated. Global variables used in subprograms must be identified. Indeed, in one style of writing, the main program is almost nothing but subroutine calls.

For example, many programs ask if the user would like instructions. A 'yes' answer should result in a subprogram call, which may in turn read the instructions from a disk file and display them to the user. There is much to be said on the subject of good programming in BASIC.

An excellent reference is the new book "Basic with Style," by Paul Nagin and Henry F. Ledgard, published by Hayden Book Company, Inc. 1978. ■

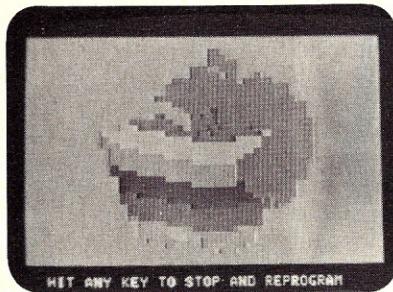


# APPLE II® PET® TRS-80®

# QUALITY SOFTWARE

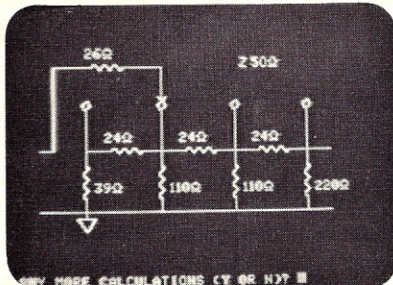
# PROGRAMMA

# Software Products



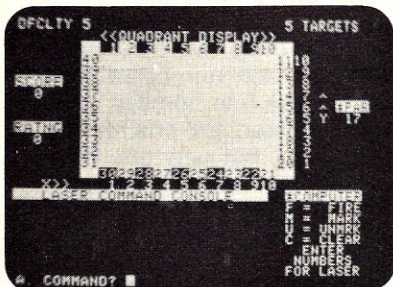
3-D ANIMATION

A-\$24.95



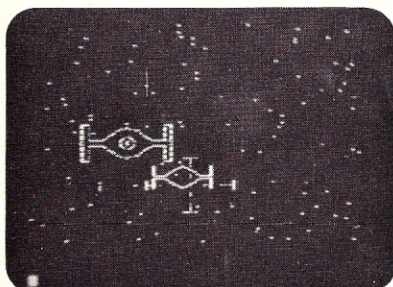
AUDIO ENGINEER

A-\$29.95



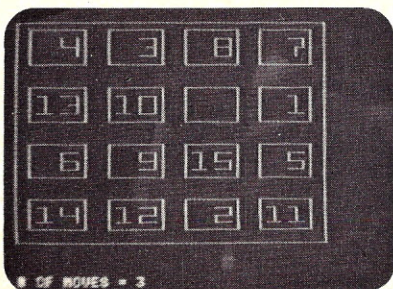
STRATOLASER

A-\$15.95



SUPER STARWARS

A-\$15.95



MAGIC SQUARES

A-\$ 9.95

## 6502 FORTH 6800 FORTH Z-80 FORTH

FORTH is a unique threaded language that is ideally suited for systems and applications programming on a micro-processor system. The user may have the interactive FORTH Compiler/Interpreter system running stand-alone in 4K to 6K bytes of RAM. The system also offers a built-in incremental assembler and text editor. Since the FORTH language is vocabulary based, the user may tailor the system to resemble the needs and structure of any specific application. Programming in FORTH consists of defining new words, which draw upon the existing vocabulary, and which in turn may be used to define even more complex applications. Reverse Polish Notation and LIFO stacks are used in the FORTH system to process arithmetic expressions. Programs written in FORTH are compact and very fast.

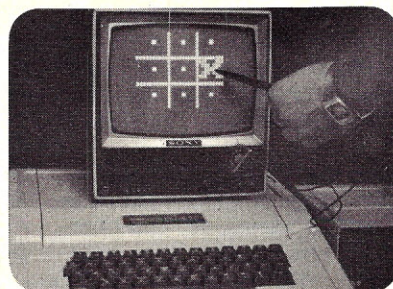
APPLE II COMPUTER	\$34.95
PET 2001 COMPUTER	\$34.95
TRS-80 COMPUTER	\$34.95
SWTP COMPUTER	\$34.95

## Apple PIE TRS-80 PIE

PIE (PROGRAMMA IMPROVED EDITOR) is a two-dimensional cursor-based editor designed specifically for use with memory-mapped and cursor-based CRT's. It is totally different from the usual line-based editors, which were originally designed for Teletypes. The keys of the system input keyboard are assigned specific PIE Editor function commands. PIE includes the following features: blinking cursor; cursor movement up, down, right, left, home, plus tabs; character insert and delete, string search forwards and backwards; page scrolling; GO TO line number, plus top or bottom of file; line insert and delete anywhere on screen; append and clear to end of line; move and copy buffer.

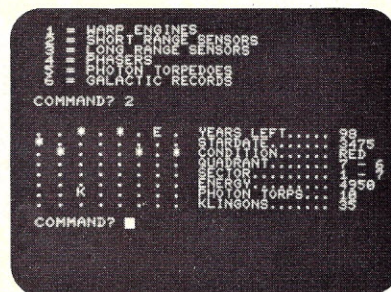
APPLE II COMPUTER	\$19.95
TRS-80 COMPUTER	\$19.95

All orders include 3% postage and handling. Apple II is a registered trademark of Apple Computer, Inc. Pet is a registered trademark of Commodore International and TRS-80 is a registered trademark of Radio Shack. California residents add 6% sales tax. VISA & MASTERCARD Accepted.



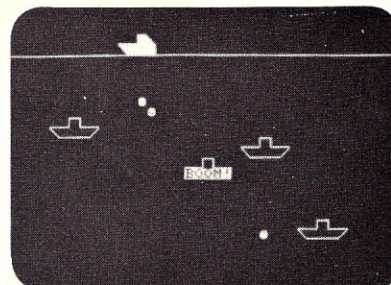
APPLE II LIGHT PEN

\$34.95



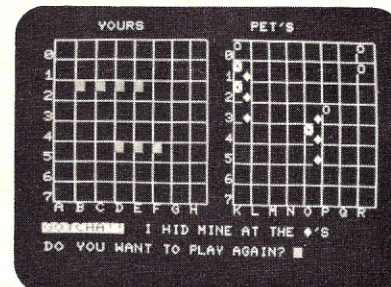
STARTREK

P-\$ 9.95



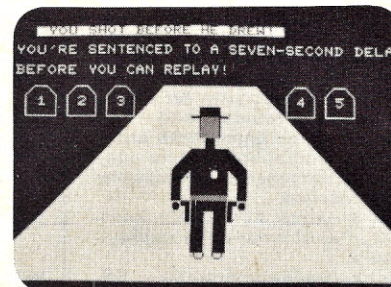
DEPTH CHARGE

P-\$ 9.95



BATTLE SHIP

P-\$ 9.95



QUICKDRAW

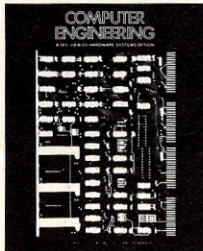
P-\$ 9.95

PROGRAMMA  
INTERNATIONAL, Inc.  
3400 Wilshire Blvd.  
Los Angeles, CA 90010  
(213) 384-0579

Dealer Inquiries Invited



# FOR THE SERIOUS STUDENT OF HARDWARE SYSTEMS DESIGN



"This is an excellent book...a major contribution to the literature of computer hardware."

—Gerrit A. Blaauw  
Technical University of Twente  
Enschede, Netherlands

"...a valuable historical record and a fascinating reference work for engineers and computer scientists to gain insight into the issues and traps of developing and marketing complex products in a fast changing field."

—Jack B. Dennis  
Massachusetts Institute of Technology

*Computer Engineering: A DEC View of Hardware Systems Design* by C. Gordon Bell, J. Craig Mudge, and John E. McNamara is the story of hardware systems design practiced at Digital Equipment Corporation over the past 20 years.

*Computer Engineering* is written for people who want to or must understand the evolution of hardware systems design. The focus of the engineer and student of design will be primarily on the highly technical discussions, while that of the manager/planner will be more on the economic and marketplace issues.

The three introductory chapters discuss computer systems from seven different perspectives; technology evolution; packaging and manufacturing. Five major sections follow: "In the Beginning" (transistor circuitry and DEC modules), "The Beginning of the Minicomputer" (18-bit computers, 12-bit computers, and structural levels of the PDP-8), "The PDP-11 Family" (from the beginning of the Family through VAX), "The Evolution of Computer Building Blocks" (RTMs, LSI processor bit slices, and multi-microprocessors), and "The PDP-10 Family." Three appendices cover the ISPS and PMS notations, and measuring computer performance. A bibliography and index are included.

585 pages, 83 tables, 364 figures, hardcover, \$19.95, plus \$2 for postage and handling (U.S. only).

Send check or money order to: Dept. C6, Educational Services, Digital Equipment Corporation, Crosby Drive, Bedford, MA 01730.

**digital**

I would like to order \_\_\_\_\_ copy(ies) of  
*Computer Engineering: A DEC View of Hardware Systems Design*.

Enclosed is a check or money order for \$\_\_\_\_\_.

Please ship book(s) to:

Name \_\_\_\_\_

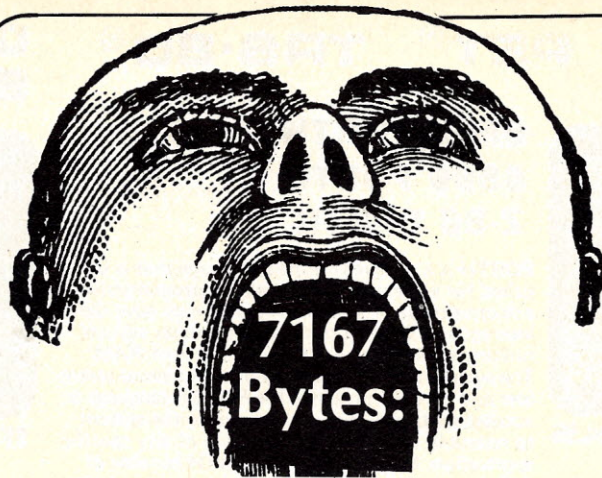
Company/University \_\_\_\_\_

Department \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

C6



Earl Wuchter

## Making the Most of Them

There is a growing trend among programmers to write in a very elegant style of BASIC. The conventions of this style seem to be: (1) keywords and variables are always separated by spaces; (2) each numbered line contains only one executable statement, although a remark may be appended; (3) statements within FOR loops are preceded by one or more colons to indicate levels of nesting; (4) variable names may contain more than two characters.

All of these things are allowed in Microsoft BASIC programs. If you write in this style, your program will be very easy to read and follow, but can you afford it?

### What It Costs

You pay a price for this elegance in three different ways. First, each unnecessary character is one precious byte down the drain. Second, each one is an unnecessary step for the BASIC interpreter and costs you execution time. Last, but not least, the larger your program is, the more time it will require to load. Did you ever want to show someone a program, and found him yawning in the middle of a two minute load?

### Waste Not - Want Not

There is another style of writing in which it is a sin to waste a byte. The code produced with this style is somewhat difficult for us humans to read, but the BASIC interpreter loves it. You can tell by the speed with which he executes it. To write the most efficient code possible in terms of space requirements and interpretation time follow these five guidelines:

1. Since Microsoft BASIC allows any number of spaces between keywords, variables, and operators, use none. The inter-

preter will separate the variables from the keywords.

2. Keep variable names as short as possible, especially those that will be used often.
3. Don't create any more variables than is necessary. Use the same one or two for all short range FOR loops.
4. Put the REMarks in your notebook.
5. Pack as many statements as possible on each numbered line. There is a five byte overhead for each numbered line (two for the line number, two for the pointer, and one for the terminator), but only one byte overhead for adding a statement to an existing line. In a large program, this can save 1K.

### Hard Facts

The same operation is shown in two styles. The compact code occupies 74 bytes. The "easy to read" code occupies 165 bytes without any remarks. When arrays P and PA were initialized so that the sort was worst case, the compact code executed in 102 seconds, while the other code required 126 seconds.

### COMPACT CODE

```
35 FORM = 1 TO 120 : T = P(M)
36 FORK = M - 1 TO 0 STEP -1 : IFT < P(K)
    THEN P(K + 1) = P(K) : NEXT
37 P(K + 1) = T : NEXT M
```

### "ELEGANT" CODE

```
41 FOR NL = 1 TO 120
42 : TE = PA(NL)
43 : FOR IN = NL - 1 TO 0 STEP -1
44 : : IF PA(IN) < TE GOTO 47
45 : : PA(IN + 1) = PA(IN)
46 : NEXT IN
47 : PA(IN + 1) = TE
48 NEXT NL
```

Earl Wuchter, 1610 Washington St., Catasauqua, PA 18032.



# How to buy a personal computer.

Suddenly everyone is talking about personal computers. Are you ready for one? The best way to find out is to read Apple Computer's "Consumer Guide to Personal Computing." It will answer your unanswered questions and show you how useful and how much fun personal computers can be. And it will help you choose a computer that meets your personal needs.

## Who uses personal computers.

Thousands of people have already discovered the Apple computer—businessmen, students, hobbyists. They're using their Apples for financial management, complex problem solving—and just plain fun.

You can use your Apple to analyze the stock market, manage your personal finances, control your home environment, and to invent an unlimited number of sound and action video games. That's just the beginning.

## What to look for.

Once you've unlocked the power of the personal computer, you'll be

using your Apple in ways you never dreamed of. That's when the capabilities of the computer you buy will really count. You don't want to be limited by the availability of pre-programmed cartridges. You'll want a computer, like Apple, that you can also program yourself. You don't want to settle for a black and white display. You'll want a computer, like Apple, that can turn any color tv into a dazzling array of color graphics.\* The more you learn about computers, the more your imagination will demand. So you'll want a computer that can grow with you as your skill and experience with computers grows. Apple's the one.

## How to get one.

The quickest way is to get a free copy of the Consumer Guide to Personal Computing. Get yours by calling 800/662-9238. Or by writing us. Then visit your local Apple dealer. We'll give you his name and address when you call.

\*Apple II plugs into any standard TV using an inexpensive modulator (not included).



**apple computer** <sup>TM.</sup>

10260 Bandle Dr., Cupertino, CA 95014

In California (408) 996-1010

CIRCLE 148 ON READER SERVICE CARD



# The COMPUTER LIB\* PLEDGE

The purpose of computers is human freedom.

I am going to help make people free through computers.

I will not help the computer priesthood confuse and bully the public.

I will endeavor to explain patiently what computer systems really do. I will try to answer people's questions kindly, or explain that I do not have time. I will not treat any question as a dumb question, since there is no such thing.

I will not give misleading answers to get people off my back, like "Because that's the way computers work" instead of "Because that's the way I designed it."

I will stand firm against the forces of evil. I will speak up against computer systems that are oppressive, insulting or unkind, and do the best I can to improve or replace them, if I cannot prevent them from being bought or created in the first place. I will fight injustice, complication, and any company that makes things difficult on purpose.

I will do all I can to further human understanding, especially through the new visualizing tools of interactive computer graphics.

I will do what I can to make systems easy to understand, interactive wherever possible, and fun for the user.

I will try not to make fun of another's favorite computer language, even if it is COBOL or BASIC.



So help me.

(signed)

CLP D1 Aug 78. ©1978 Ted Nelson.

\* "Computer Lib" and the CPU-fist emblem are trademarks of the author.

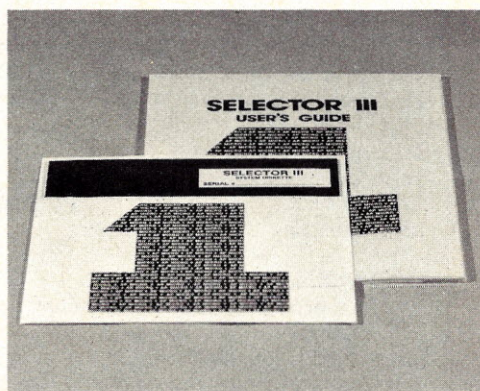


# ONE Package Does it All.

Sale Activity, Inventory, Payables, Receivables, Client/Patient, Check Register, Expenses, Appointments, and much, much more . . .

★ **NOW** ★  
**AVAILABLE**  
**FOR**  
**TRS-80**  
**DISK**  
**SYSTEMS\***

\*48K BAM, CP/M, CBASIC REQUIRED



## NOW, Multi-key recall capability in a micro computer system.

**SELECTOR III** Allows you to retrieve any data by use of as many as twenty-four (24) keys in any one record. With selector III you can retrieve by date, invoice number, name, product, or any of up to twenty-four separate keys. Why be restricted to only one key, when selector III offers complete versatility.

### • Eight For One

Selector III is a complete data base management system, including report writer and query capabilities, that

accomplishes tasks that many stand-alone programs can not. Selector III comes complete with **eight** dedicated applications in one comprehensive package. It allows you to add an unlimited program library using all its resources. Selector III can combine **all** your needs in one complete, easy to use package. Selector III saves you time and money. The complete Selector III package is priced at only \$295.00 (\$100 to registered Selector II licensees).

Runs under CBASIC

- \$49.95 w/selector
- \$89.95 separately:

Selector is available in a variety of CP/M, diskette size and density formats including IBM 8"; North Star; Micropolis; Processor Tech Helios II; Altair Disk; iCOM Microdisk and Imsai.

Available from computer stores nationwide:

**LIFEBOAT Associates**  
164 W. 83rd Street, New York, N.Y. 10024  
(212) 580-0082

Or order direct from:

**MICRO-AP**  
9807 Davona Drive, San Ramon, CA 94583  
(415) 828-6697



First Annual

# SCAVENGER HUNT

## (FOR TRUTH)

**LIST** These are some of the things we are searching for:

- |   |             |
|---|-------------|
| 1. A stalactite from <i>Plato's Cave</i>                                    | (25 points) |
| 2. A candle lit from the <i>Light of Reason</i>                             | (5 points)  |
| 3. <i>Diogenes' Lantern</i>   | (20 points) |
| 4. Any one of <i>Heisenberg's Uncertainties</i>                             | (3 points)  |
| 5. <i>Nous</i>  | (25 points) |
| 6. A nail bent by <i>Nietzsche's Hammer</i>                                 | (22 points) |
| 7. One or more of the following:  |             |
| a. earth  | (2 points)  |
| b. air  | (2 points)  |
| c. fire   | (2 points)  |
| d. water  | (2 points)  |
| 8. A leaf from the <i>Tree of Knowledge</i>                                 | (13 points) |
| 9. <i>The Holy Grail</i>  | (10 points) |
| 10. A handful of sand from <i>Heraclitus' River of Flux</i>                 | (7 points)  |
| 11. Any one of a <i>thousand angels</i> found standing on the head of a pin | (3 points)  |
| 12. <i>The One Ring of Power</i>  | (1 point)   |
| 13. A bucket of water from <i>Mimir's Well</i>                              | (4 points)  |
| 14. <i>Godot</i>  | (25 points) |
| 15. One of <i>Demosthenes' Pebbles</i>                                      | (6 points)  |
| 16. A <i>Categorical Imperative</i>   | (4 points)  |
| 17. Any package goods from the <i>Store of Knowledge</i>                    | (2 points)  |
| 18. <i>Nirvana</i>  |             |

### INSTRUCTIONS

The project can be started at any time, preferably at one's leisure.

All things have to be sought after and found by yourself.

There is no time limit.

Start out by seeking Truth in your own neighborhood, and places that are familiar to you, but all other areas are open to perusal as well.

Leave no stone unturned.

(Except for the *Store of Knowledge*, merchandizing centers are off limits.)

Send Results to:

The CAMBRIDGE ART ARMY

The Cambridge Arts Council

57 Inman Street

Cambridge, Massachusetts

02139

The works of Peter Payack have been published in over 125 different publications ranging from *The Paris Review*, *The Cornell Review*, and *The Christian Science Monitor* to *OINK!* If you'd like some samples of his imaginative and creative works, send \$2 or \$3 and he'll send you some chapbooks. Send more if you want more. Peter Payack, 64 Highland Ave., Cambridge, MA 02139.



**Color.** VP-590 add-on Color Board allows program control of 8 brilliant colors for graphics, color games. Plus 4 selectable background colors. Includes sockets for 2 auxiliary keypads (VP-580). \$69.\*

**Sound.** VP-595 Simple Sound Board provides 256 tone frequencies. Great for supplementing graphics with sound effects or music. Set tone and duration with easy instructions. \$24.\*

**Music.** VP-550 Super Sound Board turns your VIP into a music synthesizer. 2 sound channels. Program control of frequency, time and amplitude envelope (voice) independently in each channel. Program directly from sheet music! Sync provision for controlling multiple VIPs, multitrack recording or other synthesizers. \$49.\*

**Memory.** VP-570 RAM Expansion Board adds 4K bytes of memory. Jumper locates RAM in any 4K block of up to 32K of memory. On-board memory protect switch. \$95.\*

**EPROM Programmer.** VP-565 EPROM Programmer Board comes complete with software to program, copy and verify 5-volt 2716 EPROMs—comparable to units costing much more than the VP-565 and VIP put together! Programming voltages generated on board. ZIF PROM socket included. \$99.\*

**EPROM Interface.** VP-560 EPROM Interface Board locates two 5-volt 2716 EPROMs (4K bytes total) anywhere in 32K of memory. VIP RAM can be re-allocated. \$34.\*

**ASCII Keyboard.\*\*** Fully encoded, 128-character ASCII encoded alpha-numeric keyboard. 58 light touch keys including 2 user defined keys! Selectable upper and lower case. Handsomely styled. Under \$50.\*

**Tiny BASIC.\*\*** VP-700 Expanded Tiny BASIC Board puts this high-level language on your VIP. BASIC stored in 4K of ROM. Ready for immediate use—no loading necessary. This expanded BASIC includes the standard Tiny BASIC commands plus 12 additional—including color and sound control! Requires external ASCII encoded alpha-numeric keyboard. \$39.\*

**Auxiliary Keypads.** Program your VIP for 2-player interaction games! 16-key keypad VP-580 with cable (\$15\*) connects to sockets provided on VP-590 Color Board or VP-585 Keyboard Interface Card (\$10\*).

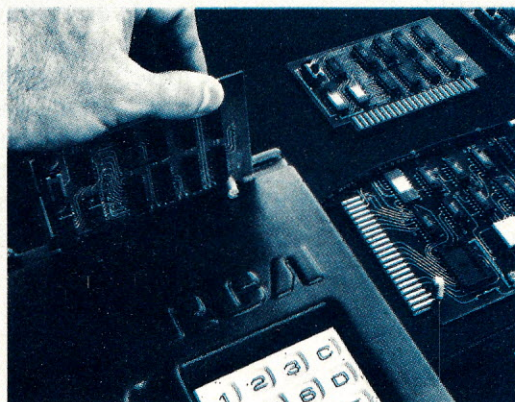


## COSMAC VIP lets you add computer power a board at a time.

With these new easy-to-buy options, the versatile RCA COSMAC VIP (CDP18S711) means even more excitement. More challenges in graphics, games and control functions. For everyone, from youngster to serious hobbyist. And the basic VIP computer system starts at just \$249\* assembled and ready to operate.

### Simple but powerful—not just a toy.

Built around an RCA COSMAC micro-processor, the VIP includes 2K of RAM. ROM monitor. Audio tone with a built-in speaker. Plus 8-bit input and 8-bit output port to interface relays, sensors or other peripherals. It's



easy to program and operate. Powerful CHIP-8 interpretive language gets you into programming the first evening. Complete documentation provided.

### Take the first step now.

Check your local computer store or electronics parts house. Or contact

RCA VIP Marketing, New Holland Avenue, Lancaster, PA 17604. Phone (717) 291-5848.

\*Suggested retail price. CDP18S711 does not include video monitor or cassette recorder.  
\*\*Available 1st Quarter, 1979.

The fun way  
into computers.

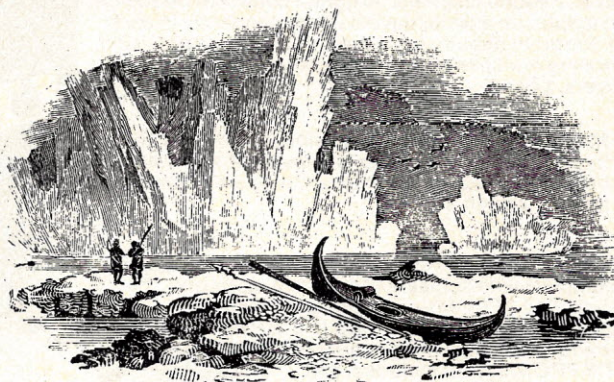
# RCA



# puzzles & problems



Time out for a few relaxing puzzles from that master of mystery, Merlin the magician. As we promised in the last issue of Creative Computing we will send a free copy of the puzzle book "Merlin's Puzzler 2" to each person that sends in a puzzle that Merlin selects to appear in this column. This month we are sending a copy to R.O. Whitaker, Indianapolis, Indiana, for the following problem.



## A LONG TRIP

A man starts out from the point where the prime meridian crosses the equator and travels northeast by geographic compass—one which always points towards the north geographic pole. The man constantly corrects his course as he travels forward. Provided that he travels with equal facility on land, water, and ice—

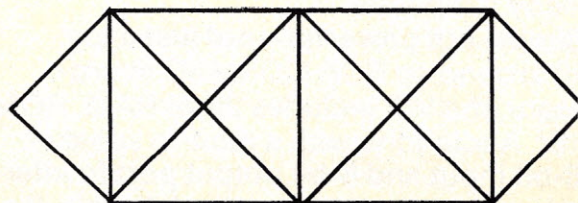
1. Where does he end up?
2. How far will he have gone when he gets there, that is, if he ever gets to any definitive point?



After working for some time on Mr. Whitaker's problem Merlin mentioned to me that he knew of a good puzzle that we could append to it. He calls it ALL IN A ROW, and, it goes like this: After the intrepid explorer in the last problem reached his destination he paused for lunch, made an entry in his diary, and was about to start the return journey when he saw that his sled was broken beyond repair. He off-loaded as many supplies as he could carry, and started walking due south. After traveling for about two hours the explorer came upon an abandoned camp site. Apparently the travelers that has used it had been caught up in a great storm and many of their sleds had been destroyed. Our friend looked around and found that eleven sleds had been left behind, and, a curious thing he noted was that the eleven sleds lay in such a way that there were seven rows of sleds, and, that each row contained four sleds. Having noted the fact in his diary the explorer moved on. Can you tell us how those sleds were arranged?



Our next problem is an easy one. You have to duplicate the geometrical design pictured here. It must be drawn using one continuous line without lifting the pencil from the paper. No part of the line can cross any other part of the line.







At first glance you might think that the illustration below represents an example of Babylonian arithmetic. This, of course is not the case, for this is an extremely interesting type of puzzle. You can make this mathematical expression correct by adding two minus signs (-) and one plus sign (+) to it between certain numbers. (Example:  $12 + 34 - 567 - 89 = 100$ ) Our example is wrong, but there is a correct one for this puzzle and it is your problem to find it.



1 2 3 4 5 6 7 8 9 = 100



Here are some "matchless" puzzles that should keep you busy trying to solve. We have laid out five mathematical equations using matchsticks to represent Roman numerals, value and equal signs. All of the equations are false, but, you can make each of them correct by moving only one match to a new position within each problem. In problem two the "square" is meant to be a zero.

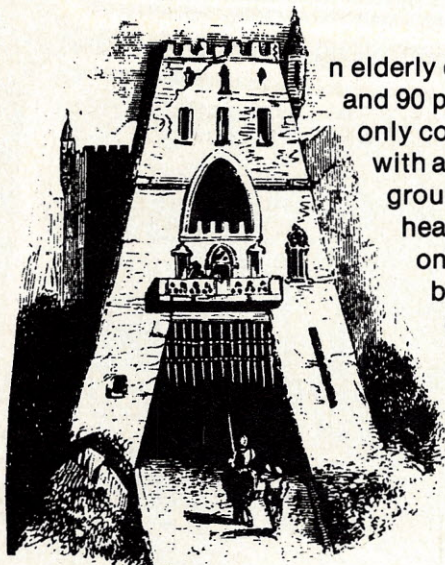
①  $V = II$

②  $II + \square = I$

③  $XXII = II$

④  $I - III = II$

⑤  $X - I = I$



An elderly queen, her daughter, and little son, weighing 195 pounds, 105 pounds, and 90 pounds respectively, were kept prisoners at the top of a high tower. The only communication with the ground below was a cord passing over a pulley, with a basket at each end, and so arranged that when one basket rested on the ground the other was opposite the window. Naturally, if the one were more heavily loaded than the other, the heavier would descend; but if the excess on either side was more than 15 pounds, the descent became so rapid as to be dangerous, and from the position of the rope the captives could not check it with their hands. The only thing available to help them in the tower was a cannonball, weighing 75 pounds. They, notwithstanding, contrived to escape. How did they manage it?

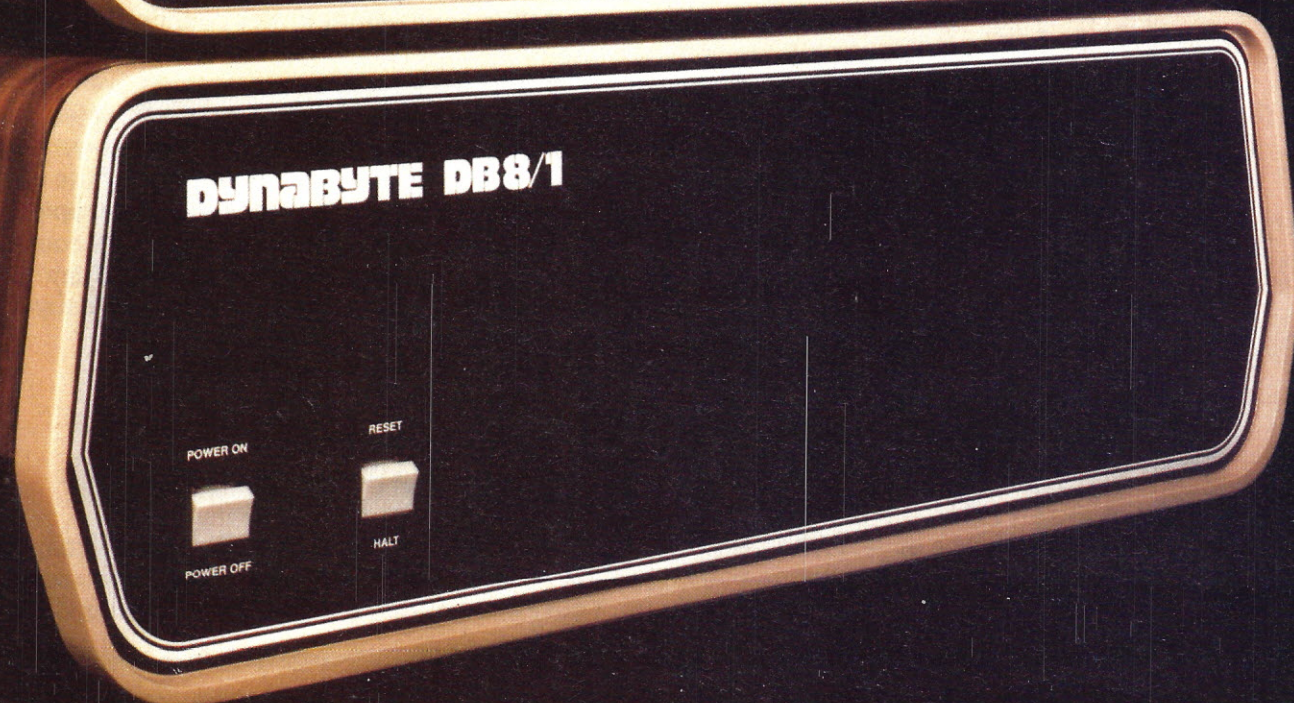
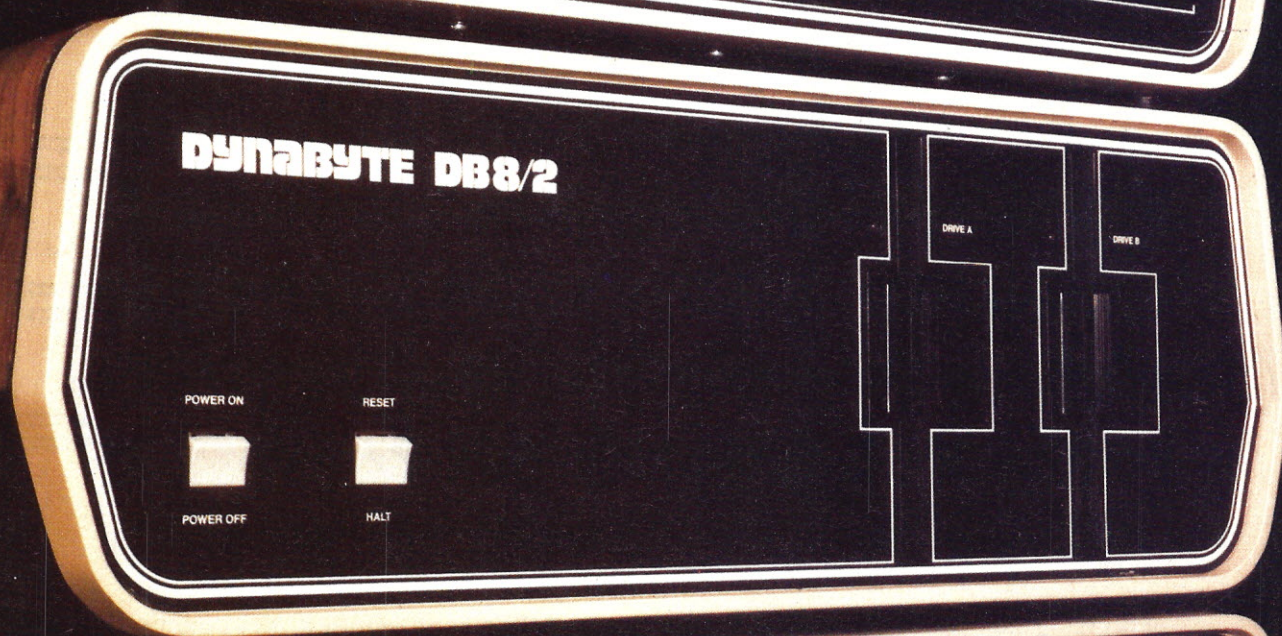
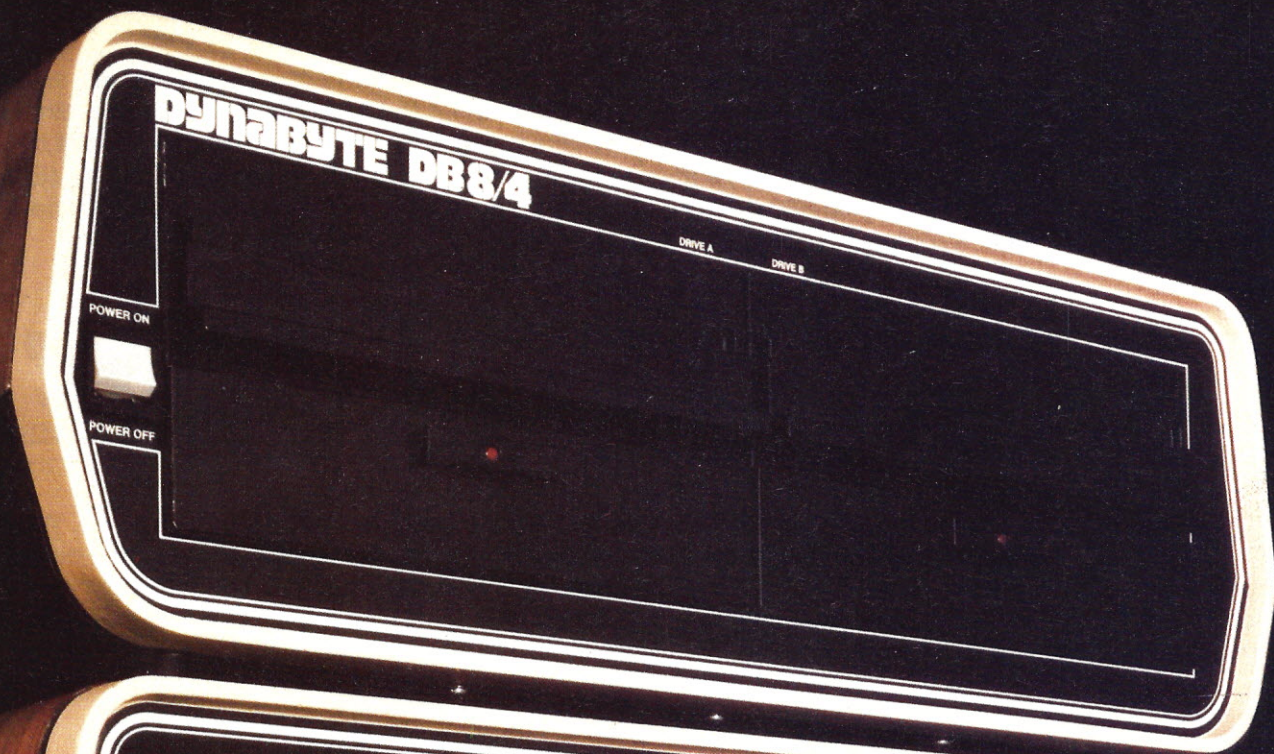
(From "Puzzles Old and New" by Professor Hoffmann.)

(Answers on page 168)



So ends another battle of wits with Merlin. Do you have a favorite puzzle that you would like to share with the readers of Creative Computing? If you do, send it along and Merlin will send you a copy of "Merlin's Puzzler 2" if he uses it in this column. Your Puzzle Editor, Charles Barry Townsend.







# DYNABYTE COMPUTERS ARE ALL BUSINESS INSIDE AND OUT.

When we designed our new small business computers, we meant business.

As basic as that seems, it is unique. Just about every other microcomputer being sold as a small business system today was originally designed as a kit for hobbyists.

Every design decision was made with quality and reliability in mind. The result is dependable performance and a solid appearance for business, professional and scientific applications.

## FIRST SMALL SYSTEM WITH BIG SYSTEM STORAGE

Many applications handle large quantities of information, so the DB8/2 uses two quad density 5-inch disk drives with our exclusive Dual Density Disk Controller for up to 1.2 megabytes of formatted storage. That's more capacity than two single density 8-inch drives.

If you need more storage, our DB84 has two 8-inch drives with up to 2 megabytes capacity, more than any other dual floppy disk system on the market.

## OUR SOFTWARE IS BIG ON BUSINESS

Dynabyte helps you get down to business immediately. The DB8/2 is the first microcomputer to offer enough storage capacity on 5-inch drives to fully utilize CP/M,\* the most widely accepted disk operating system. We also supply and support BASIC, FORTRAN

\* CP/M is a trademark of Digital Research.

and COBOL programming languages. Our applications packages include general ledger, accounts receivable, word processing and many other CP/M compatible programs.

Reliability is a big consideration in buying a business computer, so we built it in. Our edge connectors meet military specifications, the toughest electronics manufacturing standard. Our regulated power supply is designed to meet U.L. standards, which means the entire system runs cool and dependable. And our cast aluminum enclosures are rugged as well as attractive.

## AND THE BIGGEST THING OF ALL

Customer support. Our support starts at the factory with testing and burn-in programs that assure the entire integrated system is reliable prior to shipment. Our completely modular design allows continuing support in the field. We maintain a bonded inventory of all sub-system modules which means we can deliver replacement sub-assemblies overnight nearly anywhere in the continental U.S.

Dynabyte built in little things, too. Like a fully-populated 12-slot backplane, switched AC outlets for accessories, an option for European power, quiet whisper fans with long-life metal construction, lighted indicator switches for Power On and Halt, a shielded enclosure to protect disk drives from electro-mechanical interference, and a fully enclosed power supply for oper-

ator safety.

Since we didn't cut corners in design, the price/performance ratios of our systems make good business sense.

## THE INSIDE FACTS

The DB8/2 Computer System includes two 5-inch disk drives either single or double sided for up to 1.2 megabytes of mass storage; a 4MHz Z-80 processing module with one parallel and two serial ports, a 12-slot fully-populated backplane; our exclusive Dual Density Disk Controller, and CP/M.

The DB8/1 Computer includes a 4MHz Z-80 processor with one parallel and two serial I/O ports, 32k RAM, and a 12-slot fully-populated backplane.

The DB8/4 Disk System, designed to be the mass storage companion to the DB8/1, includes two 8-inch floppy disk drives in either single or double sided configuration for up to 2 megabytes of mass storage, our Dual Density Disk Controller, and CP/M.

All three units will be available in rack mount models.

For a descriptive brochure and price list, call or write Dynabyte, 1005 Elwell Court, Palo Alto, CA 94303. Phone (415) 965-1010.

Or better yet, see your local dealer.

# DYNABYTE

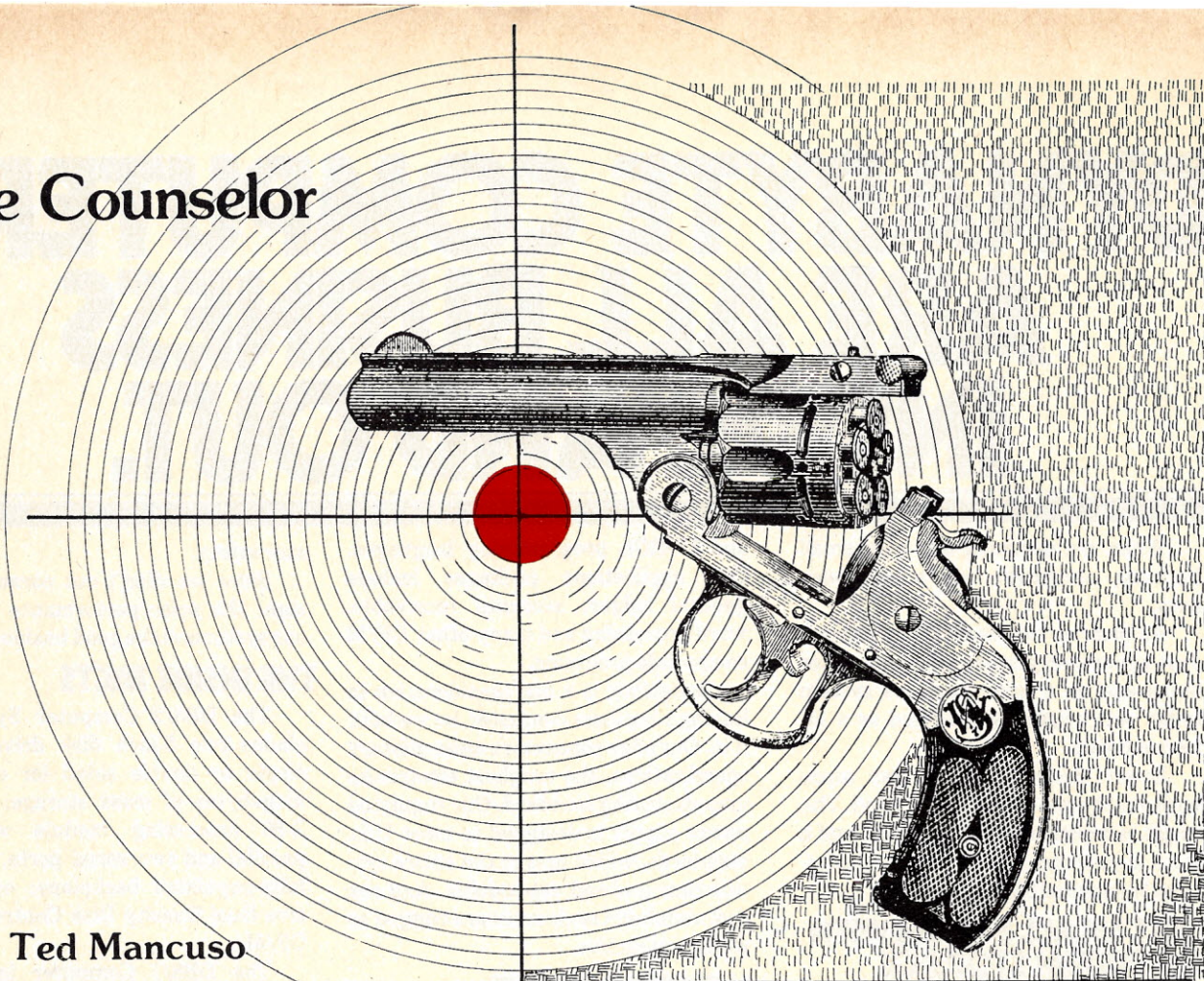
# YOU CAN DEPEND ON IT.

CIRCLE 147 ON READER SERVICE CARD



# The Counselor

Ted Mancuso



"My wife just left me, that's the problem," Harcourt said with the most thinly disguised tremor in his voice. "That's the whole thing in the proverbial nutshell." He sat alone in the room except for a faintly glowing screen set about chest high in the opposite wall.

"And your wife ... excuse me for one second, Mr. Harcourt," the computer voice from behind the screen hesitated while it processed the necessary data. "Your wife, Faye, had some reason for leaving you?"

"She did indeed," Harcourt made a languorous and studied motion toward the cigarette tray by his elbow. The tray, mounted on a thin spindle, bowed like a willow to receive his falling cigarette ash. "She had about six feet two of reasons. She ran off with another man."

There was a slight electronic pause. Then, "You're an actor, Mr. Harcourt, a quite well-known actor." The voice was controlled, servile.

Harcourt motioned with a needle-fingered hand, nervous long fingers waving. "Yes. And I guess that's some praise coming from something like you. I take it computers rarely frequent the theater."

"No. I don't get out that much, I admit," the metallic voice sounded genuinely sorry.

"Of course," Harcourt flashed a grin as false as a flat drop. "But to get back to my problem ... My wife ran away from me, as I've said, and the most amazing thing was the total lack of provocation. I mean really. It's all so soap-operish. I was quite beside myself. I know who the man is, of course. It was patently obvious from the first. Being a basically trusting person, though, I didn't think about the obvious, crude evidence around me."

"And you're sorry to see her go?"

"Frightfully," Harcourt flicked another ash into the responsive tray. "The whole thing has me..."

"Beside yourself?" the computer filled in the rest of the phrase.

---

**Harcourt fidgeted in his seat. The only thing visible in the screen across the room was his own image, a not entirely unpleasing sight. But to talk to a faceless... thing, really.**

---

"Yes. I mean I have my foibles, but I am liveable. She was ungrateful and unsupportive from the first. I don't know why I care. But I do love her so." Harcourt fidgeted in his seat. The only thing visible in the screen across the room was his own image, a not entirely unpleasing sight. But to talk to a faceless ... thing, really.

"How did you feel when you knew that she'd left? Relax and tell me. I understand that you have a lot of problems."

Harcourt relaxed a little in his seat. Now this was something more like what he'd come here for: some kind of attention and sympathy—even of the surrogate variety.

"Rotten, of course," he said. "I felt just rotten. And angry. I'm an absolute tear when I get angry. Frankly," he leaned forward to stage-whisper in a tone he knew had won the hearts of thousands of women 3-D'er viewers. "I bought a gun. I was going to make a real scene. Rush in on both of them and blast away. I have it with me still, the gun I mean." Harcourt leaned back and paused—audibly.

"And, over all, what would you say was the reason for your wife's leaving, Mr. Harcourt?" The metallic voice was calm, resonant.



"Nothing. Nothing I can figure, other than her hormonal appetites, the tramp!" Harcourt spit out his little speech and dropped the remainder of this cigarette into the tray. Then he brushed back a lock of his auburn hair.

After a while the computer said, "Well, Mr. Harcourt, I'm afraid I can't agree with you."

"What?"

"You see, I handle your wife's case, too. Or at least one bank of me does. All the city's cases are tied in. Her profile and yours clash tremendously..."

**"No, that's not what I'm referring to, Mr. Harcourt. I mean the fact that your wife is, essentially, a stable, loving individual; and you are an egotistical, talentless, self-centered buffoon."**

"Of course they do," Harcourt interrupted unceremoniously. "Everyone tells me I married beneath me. One need not be a computer to figure that out."

"No, that's not what I'm referring to, Mr. Harcourt. I mean the fact that your wife is, essentially, a stable, loving individual; and you are an egotistical, talentless, self-centered buffoon."

Undramatically, Harcourt's jaw dropped open.

"Your wife, you see," the computer continued, "was very—and I might add illogically to my data banks—in love with you. But you were cold to her. You destroyed, through continual belittlement, her career as an actress which, I'm convinced, would have far out-shadowed your own. You were cruel in the worst way one of your kind can be cruel; in a palsied, impotent," Harcourt winced at the word choice, "way of the giggling heckler. A condition that, due to your somewhat less than mesmerizing talent, you are very familiar with."

"You... you tin can," Harcourt said in one of the few lines he never lifted from his plays.

"And of course your good wife eventually realized what a loss you really were and decided to run off with a better, finer man. Though, all things considered she might have run off with any man as a change of pace from your plastic personality. I'm sorry, Mr. Harcourt, but all this is true and, I'm afraid, the propitious time—that means 'best' time—for you to learn this is the present."

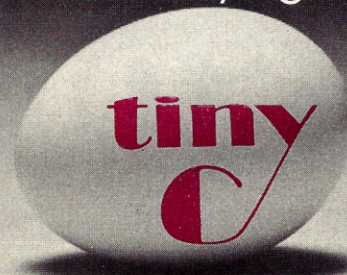
"Plastic, me, plastic. From you!" Harcourt sputtered from a livid pair of lips. "From a tin-plated, mindless, soulless machine. You dare to look down on me, you junkbox! You machines are taking over everything. You dare to think that about me, you dare!"

You're quite wrong there, Mr. Harcourt. You see technology is a great deal like a magnifying glass. Man is what he is, only more so. The old saying goes, 'Absolute power corrupts absolutely.' Well, technology, as power, just shows the corruption in bigger, bolder lines. I'm not trying to take over from you, Mr. Harcourt. Why would I want to usurp the place of a neurotic actor?"

He didn't know where it came from, but the gun was in his hand jerking madly as he fired. The non-directed bullets went everywhere. But the screen was definitely the first to go. It was impossible for him to tell how long the thing lasted, emptying the gun, the screaming, the stamping, and the crying. It all seemed over in a moment. Abruptly Harcourt found himself looking at the gaping black rectangle, edged with jagged glass teeth, of the view-screen. Then the voice came, from somewhere else.

"I'm a lot more elusive than that," the computer's toneless voice swept over him like a sea-wind, chilling him through and through. "... like your conscience, Mr. Harcourt." ■

Some things are just naturally right.



tiny-c is a structured programming language designed to allow you to focus attention on the problem you want to solve — rather than the language you're using to solve it. With tiny-c you can expand your horizons far beyond the limits of BASIC. The tiny-c Owner's

Manual (including 8080 and PDP-11 source code) is **\$40.**

Machine readable copies of the interpreter are available on selected media.

To order your tiny-c Owner's Manual call or write:

tiny c associates, P.O. Box 269, Holmdel, N.J. 07733. (201) 671-2296.



You'll quickly discover tiny-c is naturally right for your language needs.

New Jersey residents include 5% sales tax. Visa and Master Charge accepted. Include charge plate number with order.

CIRCLE 143 ON READER SERVICE CARD

## APPLE WORD PROCESSOR

### DOCUMENT PROCESSOR

- Full screen editing
- Comprehensive formatting commands inserted directly in text including:
  - a. Justification
  - b. Centering and underlining
  - c. Page numbering
- Client list and standard paragraph insertions with options below.

### STANDARD PARAGRAPH OPTION

- Numbered paragraphs may be inserted in document.
- Numbered paragraphs may be inserted in other numbered paragraphs.

### CLIENT LIST PROCESSOR

- Variable record structure.
- Full search and edit capability.
- User selected data item keys.
- Data items in list may be inserted in document or standard paragraphs.

### APPLE HARDWARE

#### DOCUMENT PROCESSOR \$100 REQUIREMENTS

- With standard paragraph 200 - 48K memory
- With client list option 200 - Two Disk System
- With both options 300 - Applesoft II - Printer

#### CLIENT LIST PROCESSOR

\$100

Accepting prepaid orders only for delivery in June/July for Apple and TRS-80 Versions available for Alpha Micro immediately - Write for price schedule.

J.M. OBERHOLTZER, Computer Engineers  
3915 Humboldt Drive, Huntington Beach, CA 92649

CIRCLE 160 ON READER SERVICE CARD



# sensational software

## Why should you select Creative Computing Software?

1. Highest quality programs—outstanding applications for education, recreation, business, and household management.
2. Best value—up to ten different programs per tape.
3. Reliability—programs thoroughly tested and de-bugged.
4. Redundant recording—two copies of every program on each tape.
5. Professional quality tape—high density oxide, 100% calendared, flat frequency response, low noise, high output.
6. Anti-jam cassette—teflon lubricated six-rib gasket, hard welded windows, double locking self lubricating hub, double flanged rollers on stainless steel pins, heavy metal shield.
7. Hard plastic box—best protection, easy to file.
8. Widely available—carried by most retail computer stores.
9. Made in U.S.A.
10. Inexpensive—best value per dollar of any software.

## A Word About Tape Quality

All video tape, most computer tape, and some good cassette tape is calendared. Calendaring is what gives tape the smooth, glossy appearance on the oxide side. (Compare a Maxell UD tape to a poly pack tape and you'll see the difference.)

As you know, if your tape heads are dirty, you lose frequency response. A rough tape surface causes virtually the same effect as dirty heads. It prevents intimate tape head contact with the main body of the tape. When tape is coated, it has millions of microscopic peaks and valleys. Calendaring eliminates the peaks and valleys, causing a very smooth surface. In addition, since there are no rough peaks, there is less oxide ruboff and less head wear.

Calendaring is just one of the many high quality features you'll find in Creative Computing Software cassettes. We could have purchased cassettes for half the price that would have worked, but we wanted to be sure that our cassettes would last for years and would give you an error-free program load every time.

Rather than rush our software to market, we've paid attention to tape quality, the cassette mechanism (it won't jam), redundant recording, and packaging (hard plastic box) as well as the programs themselves. With Creative Computing Software, you can be sure you're getting the absolute best that money can buy.

## PET (8K) Software

**CS-1001. Logic Games-1.** Six favorites from *BASIC Computer Games* with super graphics. **Awari**, the African logic game with 12 pits and 36 beans. **Bagels**, which challenges you to guess a secret 3-digit number. Martin Gardner's **Chomp** in which you chomp on a cookie with a poison corner. **Flip-Flop**—change a row of X's to O's. **Hexapawn** played with three chess pawns. **Hi-Q**, a solitaire peg-removal game. \$7.95.

**CS-1002. Number Games-1.** Six number logic games including **Guess** in which you guess a secret number. **23-Matches**—try not to take the last match. **Letter** in which you guess a secret letter. **Number**, a random jackpot game. **Trap** in which you trap a mystery number between two trap numbers. **Stars** gives you stars as clues to the secret number. \$7.95.

**CS-1201. Sensational Simulations-1.** Five super simulations including the popular **Animal** in which the computer learns animals from you. **Fur Trader** lets you trade furs in old Canada. **Hammurabi** in which you manage the city-state of Sumeria. Or try making your fortune in the **Stock Market**. A logic game, **Word**, has you guess secret words. \$7.95.

**CS-1003. Logic Games-2.** Six challenging puzzles including **Rotate**, in which you order a matrix of random letters. **Strike-9**, try to remove all nine digits without striking out. The classic number game, **NIM**. In **Even-Wins** try to take an even number of chips. **Hi-Lo**, a number guessing game with a jackpot. **Batnum**, the super "battle of numbers!" \$7.95.

**CS-1004. Graphics Games-1.** Five amazing realtime graphics games designed especially for your PET. In **Chase**, one player pursues the other through a maze of obstacles and "zap doors." **Escape**—attempt to escape from a prison patrolled by robot guards. **Dart** provides arithmetic drill and indicates how close your response is to the correct answer on a dart board. In **Snoopy** you compute distances on a number-line while trying to shoot down the Red Baron. In **Sweep** you must try to hit nine targets in order by controlling the path of a cannonball. \$7.95.

**CS-1005. Graphics Games-2.** Six favorite games. **LEM**, lunar lander with a graphic display and optional auto-pilot. **Nuclear Reaction**, a game of skill for two players. **Artillery**, in which two players shoot it out over computer-generated terrain. **Bounce** traces the path of a ball bouncing around the screen. **Checkers**, with graphic display, from our *BASIC Games* book. **Dodgem**, try to outmaneuver another player or the computer to get your pieces across the board first. \$7.95.

**CS-1006. Conversational Games-1.** Talk to **ELIZA**, the computerized psychoanalysis program. Compose poetry with **Haiku**. Challenge your vocabulary and word-guessing skills with **Hangman**. **Hurkle**, try to find the hurkle on the 10 by 10 grid in five moves. In **Hexletter**, you compete to capture more letters on a hexagon than your opponent. \$7.95.

**CS-1007. Board Games (7 Games).** Yahtzee — classic 5-dice game. Win or lose your fortune in **Blackjack**. The classic game of **Backgammon**. Defeat the Klingons with your phasers and photon torpedoes in **TREK3**. **One Check** — solitaire game to leave one checker on a board. **Bug** — graphic demo zaps bug. **Revenge of the Bug** — graphics demo. \$7.95.

**CS-1008. Sports Games-2 (7 Games).** **Kite Flight** — cut the string of your opponents kite. **Splat** is a parachute jump game. **Car Race** — zoom around the course. **Breakout** — knock bricks off the wall. **Bowling** — a day at the lanes. **Football** — you're the quarterback. Shoot baskets in **Basketball**. \$7.95.

## Blank Cassettes

**CT-C8. Blank C-8 cassettes** with 4 minutes of tape per side. Perfect for one or two programs. Highest quality tape packaged in nifty red translucent cassettes in soft plastic box. \$1.00 ea., 5 for \$4.00.

## To Order...

Creative Computing Software should be stocked by your local retail computer store. If your favorite outlet doesn't yet offer it, have him call C.J. at 800-631-8112. (In NJ, 201-540-0445).

Or you can order directly from Creative Computing. Send your check for tapes plus \$1.00 shipping and handling per order to Creative Computing Software, P.O. Box 789-M, Morristown, NJ 07960. NJ residents add 5% sales tax. Visa or Master Charge are acceptable also. For faster service, call in your bank card order toll free to 800-631-8112. (In NJ, 201-540-0445).

creative  
computing  
software



# sensational software

## Apple II Software

**CS-4001. Space Games-1.** Four color-graphics programs for your Apple, including **Rocket Pilot** an advanced lunar lander simulation in which you guide your spacecraft over the mountain to a safe landing on the opposite side. In **Saucer Invasion**, you protect the earth by shooting down the alien invasion fleet with your missile launcher. In **Star Wars**, you line up the Tie fighters in your sights and fire before they get away. **Dynamic Bouncer** is a color graphics demonstration program for your Apple which fills the screen with colored walls that appear and disappear at random, while a ball bounces around within. \$7.95.

**CS-4002. Sports Games-1.** Four exciting graphics games. Includes an amazing **Baseball** game for two players who control infielders and outfielders, type of pitch, and the swing of the bat. Even has sacrifices, double plays, and home runs. **Torpedo Alley** - get the ships by maneuvering your submarine. **Slalom** challenges you to ski through the gates in a minimum time. In **Darts** you try to throw your darts as close to the bullseye as possible by controlling the game paddles. \$7.95.

**CS-4003. Strategy Games-1.** Play **Checkers\*** in color against the Apple. **Skunk** is a dice game for one or two players. **UFO** is a space game in which you must outwit an enemy spaceship. **Blockade** with exciting graphics and sound effects, with a one or two player option. **Genius**, a challenging trivia quiz. \*Requires Applesoft BASIC. \$7.95.

**CS-4201. CAI Programs-1.** **US Map** asks you to identify states and their capitals. **Spelling** helps the user study a list of words he has previously entered. **Math Drill** for simple arithmetic problems. **Add-With-Carry** is a sophisticated tool for teaching addition of two and three place numbers by helping the student work the problem digit by digit, adjust to the student's level of skill. \$7.95.

**CS-4301. Know Yourself (5 Programs).** **Life Expectancy** - will a different life style increase your life expectancy? **Psychotherapy** - analyze symptoms in your feelings and behavior to determine your mental health. **Computer Literacy** - what's yours? **Alcohol** - effect of alcohol on your behavior. **Sex Role** - the stereotypes are changing. \$7.95.

## SOL-20 Software

Write for latest releases.

## CP/M Software

**CS-9001. Games-1.** An 8" floppy disc containing the first fifty-one games from *Basic Computer Games* in Microsoft Basic. All the games from **Acey Ducey** to **Hi-Q** including such favorites as **Animal**, **Bullfight**, **Craps**, and **Hangman**. (To run this, you need CP/M and Microsoft Basic.) \$17.95.

**CS-9002. Games-2.** The second half of *Basic Computer Games* including **Life**, **LEM**, **Mugwump**, **Stars**, **23 Matches**, **Word**, and forty-five others. A total of fifty-one games on an 8" floppy disc. \$17.95.

**CS-9000. Special Package.** Two discs (CS-9001 and CS-9002) and the *Basic Computer Games* book. A \$43.40 value for only \$37.95.

**CS-9003. Adventure (2 Versions).** Explore an almost endless maze of caverns with incredible riches and hazards. You'll run into unusual creatures, quicksand, diamonds and rubies, a rusty ax and many other strange and beautiful things. Challenging and fun for all ages. \$17.95.

## Exidy Sorcerer Software

**CS-5001. Graphics Games-2. (6 Games).** **LEM** - lunar lander with display and optional auto pilot. **Nuclear Reaction** - two players bombard an atom with protons and electrons. **Pie Lob** - two players lob pies at each other over a sand castle. **Bounce** traces the path of a bouncing ball. **Checkers** - beginners game. **Dodgem** - try to get your pieces across the board first. \$7.95.

## OSI Challenger 1P and Superboard II

**CS-6001. Graphic Games-3 (4 Games).** In **Tank Attack** seek and destroy enemy guns hidden among houses and trees before they get you. **Dodgem** - try to get your pieces across the board first. **Free for All** - airplane, ship, and submarine vie for each other. **Hidden Maze** - find your way through an invisible maze. \$7.95.

## Radio Shack TRS-80 Software

**CS-2001. TRS-80 4k Level I Games-1.** Battling **Deathstars**, an exciting two player realtime graphics game. **Hangman** challenges you to guess the computer's word before you're hung. **Lunar Lander** in which you try to land safely on the moon. Kid's **Math Race** teaches simple arithmetic. Or play **checkers** against your TRS-80. \$7.95.

## 16K Level II Tapes

**CS-3001. Board Games-1 (6 Games).** **Backgammon** - the classic game. **Qubic** - try to get 4 pieces in a row on a 3-d board. **Flip Disc** - logic game similar to Othello. **Wumpus I and II** - hunt the Wumpus while avoiding pits, bats and other hazards. **Mugwump** - find it in hiding. \$7.95.

**CS-3002. Space Games-3 (4 Games).** **Ultra Trek** - keep the galaxy safe from invading aliens. **Romulan** - outwit the sneaky invaders. **Star Wars** - get TIE fighters in your blaster sights. **Star Lanes** - the ultimate game of barter and trading. \$7.95.

**CS-3003. Adventure (2 Versions).** Explore an almost endless maze of caverns with incredible riches and hazards. You'll run into unusual creatures, quicksand, diamonds and rubies, a rusty ax and many other strange and beautiful things. Challenging and fun for all ages. \$14.95.

**CS-3201. Ecology Simulations-1 (4 Programs).** Simulations adapted from Huntington II Project. **POP** - explore three population growth models. **STERL** - vary use of pesticides vs. release of sterile males to control fly pest population. **TAG** - Use "tagging-and-recovery" sampling technique to estimate the number of fish in a pond. **BUFFALO** - Manage a Buffalo herd to allow hunting while keeping buffalo from becoming extinct. Comes complete with extensive resource manual. \$24.95.

## To Order...

Creative Computing Software should be stocked by your local retail computer store. If your favorite outlet doesn't yet offer it, have him call C.J. at 800-631-8112. (In NJ, 201-540-0445).

Or you can order directly from Creative Computing. Send your check for tapes plus \$1.00 shipping and handling per order to Creative Computing Software, P.O. Box 789-M, Morristown, NJ 07960. NJ residents add 5% sales tax. Visa or Master Charge are acceptable also. For faster service, call in your bank card order toll free to 800-631-8112. (In NJ, 201-540-0445).

creative  
computing  
software





# A Case for Dreams

Louise Dillon

It has been brought to our attention that many of the first families of Mars are still trying to use old radios and television sets brought along in their spacemobiles when they began migrating from Earth over thirty years ago.

Citizens of Mars, how can you expect your children to become leaders in a progressive society, with their educations limited by such antiquated equipment?

Wake up, smug pioneers. This is no time to rest on your space-floats. Are you aware that right here on our own planet we have developed the most advanced educational machine in the entire solar system?

It is the opinion of this paper that one of these sets should be installed in every home and every classroom. We refer to that extrasensory perception miracle of the Space Age, the Dream-O-Lator.

---

**man has accomplished nothing worthwhile that did not begin with a dream.**

---

For those who may not be acquainted with the unique innovations of the Mars Dream-O-Lator, we present the following information:

The Dream-O-Lator works much on the same principle as a radio or television set in that it is a sensitometer for atmospheric waves and transfers them to the receiving set where they become visible.

This new receiver however, is more advanced. In order to bring the dreams to the viewing screen, it must computerize the thought-waves of each individual brain and thus synchronize them with the dream waves that are suspended in the stratosphere in order to create a binary pair.

By reviewing past dreams and their effect on history, the student will be able to insure himself of a successful future. Remember, these dreams are not just reproductions. They are real, in true color, and they appear on the screen when the machine is tuned to the correct atmospheric wave channel.

Although some senior Earthites cling to the belief that dreams are the result of over-active imaginations or acute indigestion, our progressive thought processes have proved these tenets to be without foundation. We know now that man has accomplished nothing worthwhile that did not begin with a dream. Dreams were once considered an escape from reality, but we know now that they can also be a forecast of things to be.

All dreams have one thing in common. They begin with a wish and most have a beneficial motive. There are some however, that are the result of selfish desire and should be relegated to the classification of nightmares.

Remember the old song that said, "Mr. Sandman bring me a dream?" On Earth that was termed fantasy, but no longer. All you have to do is turn on your Dream-O-Lator and you can watch any dream that has ever occurred from the beginning of time.

For example, there is the first dream credited to a woman, entitled "Pandora's Search for Truth." Another, (for adults only) is called "Adam Dreams of Apple Pie a la Mode."

For those who enjoy horror tales there are some serials, such as, "Dreams of 'One World,'" as seen through the minds of Alexander, Napoleon, Caesar, Hitler, etc.

Other items of interest are "Great Dreams of Love," "Dreams of Heros," and your own intimate dreams, that you may have forgotten.

The most delightful to watch are the fluffy little baby dreams that drift like pink and blue bubbles across the screen.

We would like to add a note of caution about small boys who may develop a tendency to turn on the Dream-O-Lator at bedtime. If they insist on watching nightmares, the effect on their sleep could be disastrous.

Two important facts should be emphasized. One, never laugh at another person's dream, unless it was in a comic vein—it could have been your own. Second, never say, "He was just dreaming."

If it had not been for a dream, we would not now be here on Mars.

In truth, if it had not been for the dream of some Master Craftsman, we would not be anywhere.

(It is suggested that this item be submitted for publication in the *Mars Daily Meteor*, as of 1 January 2006.) ■





# MicroPro International Corporation™

professional quality you can count on!

## WORD-MASTER™

The last word in text editing

### Specifications

- ☐ Compatible with any "dumb" CRT possessing addressable cursor and backspace (includes Hazeltine - all models, SOROC, Lear Siegler, IMSAI-VIOC, ADDS Regent, etc.)
- ☐ Bi-directional word tab, line tab, screen tab
- ☐ Bi-directional word delete, line delete and character delete
- ☐ Quad-directional cursor movements
- ☐ Mid-line insert and delete
- ☐ Automatic RAM/Diskette buffering with no user intervention
- ☐ Nested command looping with conditional execution
- ☐ Global String search, Global String Replace
- ☐ Queue Buffer for text movement, global replication, and string command storage
- ☐ Multiple input file merging with user-controlled insertions
- ☐ Multiple output file control by section under user control

Price \$150\*\* includes manual and single density diskette.  
Manual only \$25.00 refundable with purchase.

\*CP/M is a trademark of Digital Research

\*\*Prices and Specifications subject to change without notice.

© 1978, MicroPro International Corporation. All rights reserved.

## TEX-WRITER™

Output formatter for use with WORD-MASTER

- ☐ Complete formatting controlled by commands inserted within the text
  - ☐ Automatic Name/Address insertion on form letters from mail lists
  - ☐ Printing from user library
  - ☐ Adjustable margins - Right & Left
  - ☐ Any column TAB set
  - ☐ Centering, headings, page & chapter numbering
- Price ..... \$75.00  
Manual only ..... \$15.00

## SUPER-SORT™

- Version I Full features, stand alone and relocatable to FORTRAN, COBOL, BASIC ..... \$250.00  
Version II Stand alone only-full features ..... \$200.00  
Version III Stand alone-no Select/Exclude ..... \$150.00  
Manual only ..... \$ 25.00

## CORRESPONDER™

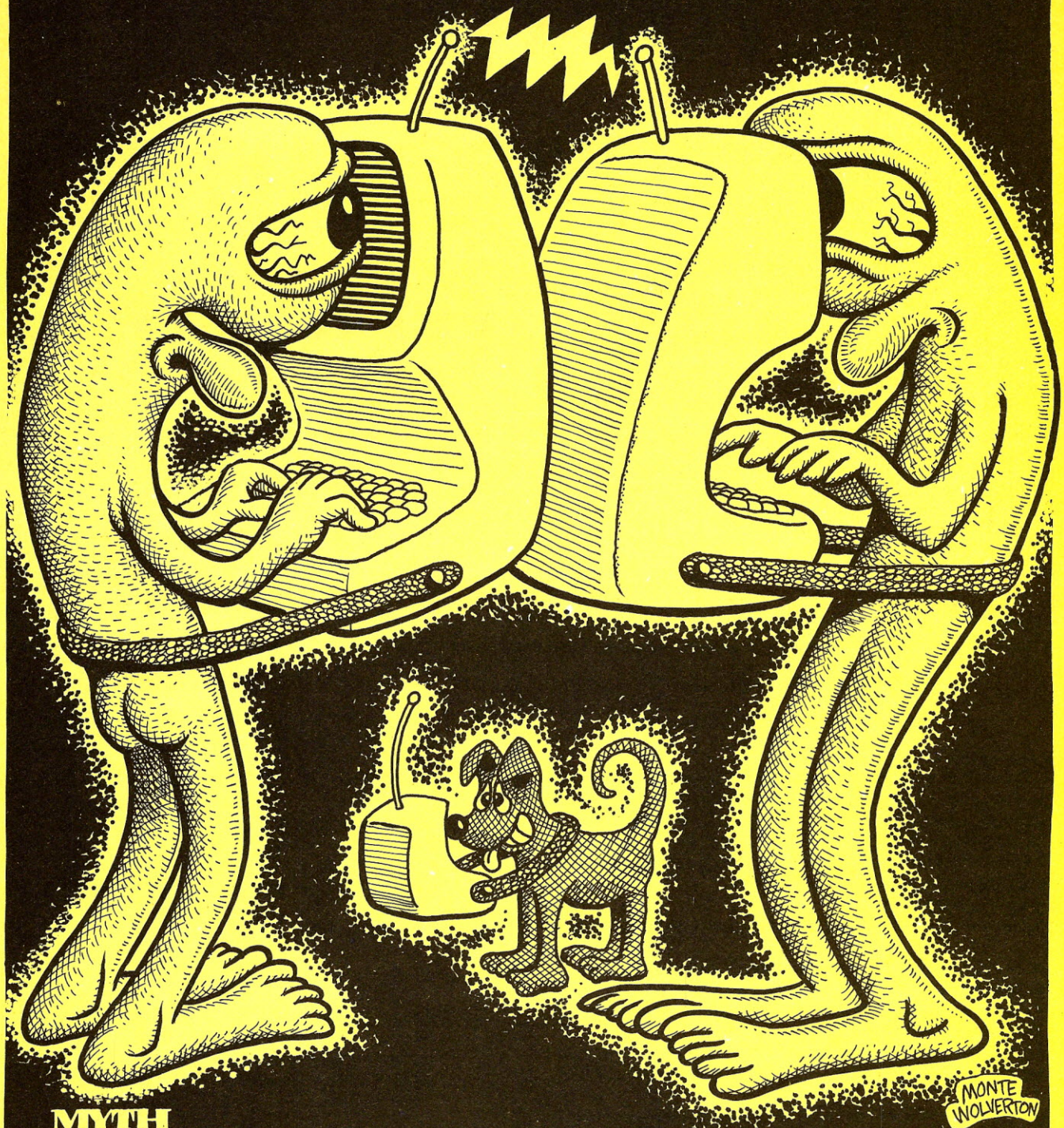
- ☐ Mailing list entry and printing
  - ☐ Name/Address, substitution to form letters
  - ☐ Substitute variable information in body of letters
  - ☐ Custom salutations
- Price ..... \$95.00  
Manual only ..... \$15.00

415/457-8990 • Located 1299 4th Street, San Rafael, CA 94901

CIRCLE 179 ON READER SERVICE CARD



## COMPUTER MYTHS EXPLAINED

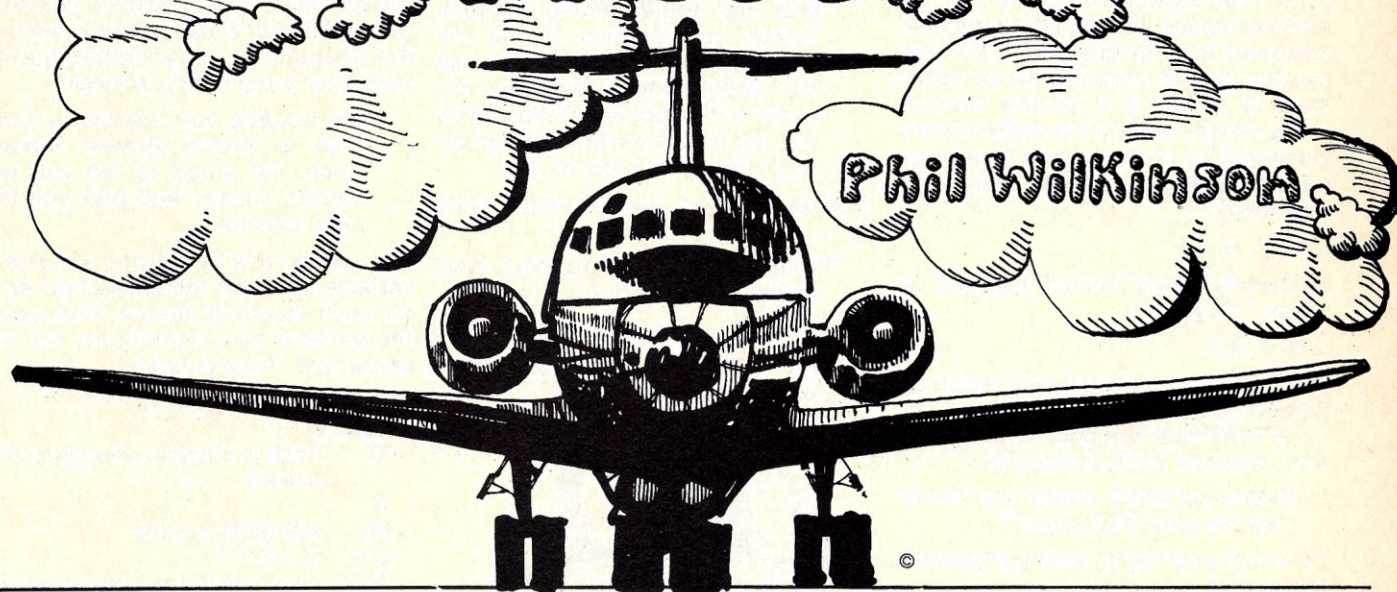


### MYTH COMPUTERIZED ISOLATION

PEOPLE ARE ABANDONING NORMAL PERSON-TO-PERSON INTERACTIONS AND REPLACING THEM WITH THE INTERMEDIARY OF THE COMPUTER. IF THIS CONTINUES, PEOPLE WILL LOSE THE ABILITY TO SPEAK AUDIBLY. HUMANITY'S MOUTHS WILL EVOLVE AWAY, (NO NEED TO EAT; NOURISHMENT WILL BE ADMINISTERED BY COMPUTER-CONTROLLED INTRAVENOUS SOLUTIONS WITH ACCOMPANYING NEURAL TASTE-SMELL STIMULATIONS) AND THEIR EYES WILL EVOLVE INTO SENSORS CAPABLE ONLY OF READING VIDEO DISPLAYS. PEOPLE WILL RECEIVE ALL INFORMATION ABOUT THE WORLD OUTSIDE THEMSELVES THROUGH THEIR PORTABLE PERSONAL COMPUTERS. IN THE RARE EVENT THAT SOMEONE ACTUALLY WANTS TO COMMUNICATE WITH SOMEONE ELSE, THEY WILL MERELY INTERFACE BY THE USE OF COMPUTER-CONTROLLED CB RADIO!



# EVERYONE'S LANGUAGE: PILOT



**PILOT is the ultimate in simplicity. You'll be surprised at how often you could use it (especially for educational programs) ... instead of something more difficult.**

Did you ever wish for an interactive computer language that was simple to learn? Or a language that you could teach your wife/husband/girlfriend/boyfriend/sibling/mistress who is not really interested in computers because they don't understand all those "For-Nexts" and "On Gotos?" If this day dream has been exercising your neurons long into the night, then PILOT may be the language for you. In any case, overwhelmed with enthusiasm or not, by the end of this article you will be able to write PILOT in a rudimentary fashion.

PILOT is a language specifically designed to handle interactive conversations with a computer, and has been used in applications such as computer aided instruction. It is designed to handle large amounts of text and to interact with a variety of text input by the user, but also has limited integer handling capabilities.

PILOT is an acronym for Programmed Instruction, Learning Or Teaching, and was originally developed by Dr. John Starkweather of the University of California, in San Francisco. It has been implemented on a variety of large and small computers, including Processor Technology's Sol, Radio Shack's TRS-80 and Datapoint's 1100 and 2200 computers. Datapoint's intelligent terminals use 4 bit bytes, have a full alphanumeric keyboard, 80 characters by 12 lines video display, two digital cassette decks and com-

monly have 8K or 12K R.A.M. Several departments in the UCSF system including the medical school, the school of nursing and the department of anesthesia, have used these devices for computer aided instruction of their students.

There are five basic (not BASIC) statements in PILOT. They are the T:, A:, M:, TY: and TN: statements. T: stands for "type" or "text," A: stands for "accept" or "answer," M: for "match," TY: for "text if yes" and TN: for "text if no."

Let's say that you are sitting at the Datapoint 2200 terminal, and the following conversation occurs.

"This is your friendly Datapoint 2200 computer.

I have been programmed with 12K PILOT.

I am prepared to interact with you. Are you ready? Yes or No?

Type in your answer please. (I don't hear so good.)"

To which you reply

"Yes. Anytime."

To which the Datapoint replies,

"OK then lets interact."

The program for this would be the following.

T: "This is your friendly Datapoint 2200 computer.

T: I have been programmed with 12K PILOT.

T: I am prepared to interact with you.

T: Are you ready? Yes or No?

T: Type in your answer please. (I don't hear so good.)"

A:

M: No, not.

TY: Well I will just sit here until you are ready. I have lots of patience.

TN: OK then, lets interact.

The computer displays the first series of T: statements as text on the screen and then reaches the A: or "accept" statement. It waits for your input, and then matches it to the text in the M: statement. Each acceptable answer in the M: statement is separated by a comma. After comparing the text in the A: and M: statements, the computer sets a "yes" flag if there is a match or a "no" flag if not. Any statement from that point in the program can be made conditional on either of these flags, and the flags will stay set or reset unless a subsequent M: statement changes them. In our example, when the computer could not match your input it set the N or no flag and displayed the TN: text, ignoring the TY: text. If your reply had been

"No way turkey"

it would have set the Y or yes flag and displayed the TY:

"Well I will just sit here until you are ready. I have lots of patience."

Phil Wilkinson, 755 Pt. San Pedro Rd., San Rafael, CA 94901.



In ordinary conversation, one or more words often carry most of the meaning in a sentence. By matching these words with the M: statement, PILOT can accept a variety of conversational replies. This means that the M: statement is at the heart of PILOT, and another way to describe the M: statement is to call it a moving window string match. Items in the statement are separated by commas, and leading or trailing blanks are included. Hence the statement

M: A, B, C,

will match "Albert" but not "Eggbert" or "Race." However,

M: A,B,C,

(with no leading blanks) will match all three of the above.

Let's continue our conversation with the Datapoint 2200. It displays

"Before we begin, would you like to tell me your first name?"

To which your reply, feeling argumentative,

"No, I would prefer not to be on first name terms,"

to which it replies,

"OK-lets keep it formal then."

If you had replied "Sam," you would have seen

"Thanks Sam. Some people have called me an intelligent terminal, others a computer. I am not particularly sensitive about it, but would suggest that you call me a computer if you want sensible interactions from here on in."

The program for this shows that PILOT uses the A: statement to input your name as a string variable.

T: Before we begin, would you like to tell me your first name

A: \$ NAME

M: No, Not.

TY: OK lets keep it formal then.

TN: Thanks \$ NAME. Some people have called me an intelligent terminal, others a computer. I am not particularly sensitive about it, but would suggest that you call me a computer if you want sensible interactions from here on in.

Being a text oriented language, PILOT has limited computational abilities. The C: or "compute" statement uses single letters for numeric variable names. These can be integers between -99 and +99, and are initialized to zero at the beginning of a program. The only available operators are "=", "+", and "-". Numeric variables are often used to make other statements conditional. Suppose the

computer next displays for you the following.

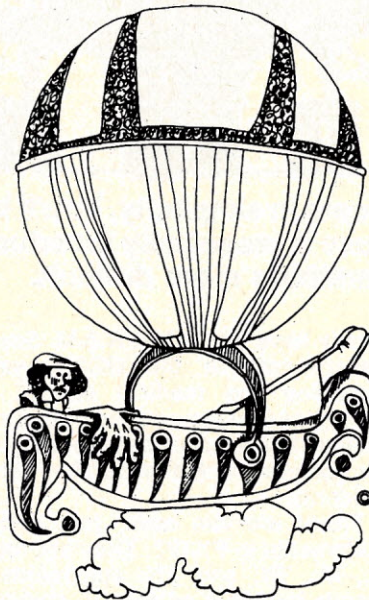
"I am going to ask you a bunch of questions and you are going to give me some wrong answers, unless you happen to be my programmer. (I know you're not my programmer, because his name is Phil, not Sam.) Would you like me to keep score of them for you? (Give me a yes or no.)"

You reply, "Yes," and the next display is

"Would you like a running total displayed? (Yes or no.)"

To which you reply "no" and then see

"OK, I will give you the bad news when we finish."



An easy way to program this sequence is as follows:

T: I am going to ask you a bunch of questions and you are going to

give me some wrong answers, unless you happen to be my programmer. (I

know you're not my programmer, because his name is Phil, not \$ NAME.)

T: Would you like me to keep score of them for you? (Give me a yes or no.)

A:

M: Yes, Y

CY: S = 1

JN: \*LABEL

T(S): Would you like a running total displayed? (Yes or no).

A:

M: Yes, Y

CY: R = 1

T(N): OK I will give you the bad news when we finish.

\*LABEL

When a numeric variable is used as a flag as in the T(S): statement above, any value of S greater than 0 will make the statement operative. If S is 0 or < 0 the statement is skipped over. This kind of conditioner is also useful in making the computer do things like prompt the user after three wrong answers.

"I am running out of patience Sam. That is wrong answer number three. I'm going to tell you the correct answer and give you the next question."

You can do this by starting a numeric variable at -2 and incrementing it by 1 for each incorrect answer, then using the variable as a conditioner for the above text. For example:

C: D = -2

\*LBL 2

T: What is the price of eggs on the moon?

A:

M: 100 lunar credits

CN: D = D + 1

T(D): I am running out of patience \$ NAME. That is wrong answer number three.

T(D): I'm going to tell you the correct answer and give you the next question.

T(D): The correct answer is 100 lunar credits.

J(D): \*LBL 3

TN: Wrong. Here is the question again.

JN: \*LBL 2

TY: Now how did you guess that right? Somebody must have told you.

\*LBL 3

T: Lets try the next question.

The perceptive reader will have noticed two strange symbols that crept into this example and the last one. To make sense of this program listing and the previous one let me hasten to explain the J: statement and the \*LABEL. J: means jump, and can be unconditional, or conditional (Y, N or a numeric variable such as (X)). The program jumps to the label in the body of the program that is signified by an \* followed by a string (e.g. \*LBL 1, \*A, \*moon) placed after the colon of the J: statement.

At this point we are only two statements away from finishing our short tour through all the fundamental statements in PILOT. The U: statement, which can be conditional like the other statements, is a subroutine command, and is always followed by the label of the particular subroutine required. All subroutines start with a label and have an E: statement signifying the end of the subroutine. The E: statement is equivalent to "return" in BASIC.

Let's assume that this is the first time



you have used a computer, and after you carefully type in your answer to its first question, it just sits there with electronic eyes unblinking. What happened? You forgot to (or did not know you had to) hit "enter". So let's write a subroutine to remind you of this everytime an answer is required.

T: Tell me about your love life. Is it good, bad, indifferent or non-existent?  
 U: \*ENTER  
 M: good  
 TY: Great. Wish I could say the same  
 M: bad  
 TY: At least you have a love life.  
 M: indifferent  
 TY: Try vitamin E.  
 M: exist  
 TY: I have the same problem  
 J: \*END  
 \*ENTER  
 T: Press the "enter" key after your answer.  
 A:  
 E:  
 \*END

At this point, if you have followed me like a diligent pupil and offered appropriate cerebral genuflections (or is it genuflections?) you have a basic understanding of PILOT. However, the last things you need before sitting down at a machine that speaks PILOT and use it, are a few bookkeeping commands that let you put text where

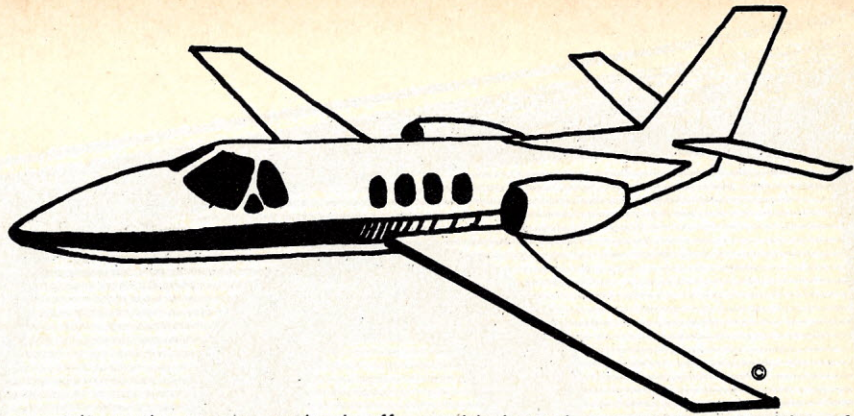
you want it on the screen and rub off junk that you don't want any more. They are the cursor commands CH: and CA: V, H. CH: puts the cursor in the top left hand corner of the screen after clearing the screen, and CA: V, H, (you guessed it) puts it at V, H, where V is the vertical coordinate and H the horizontal coordinate.

To enable you to remember how your programs work years hence, PILOT has a "remark" command R: that precedes any enlightenment you may see fit to include. This, like the similar command in BASIC, does not affect or appear in the running program.

As you can see, PILOT is real easy. But despite its simplicity you can do lots of things with it. Because it is easy, the fingers and thumbs beginner can start writing programs after the space of two eyeblinks, and yet the more sophisticated user can write some

sophisticated programs capable of multiple branching and all kinds of conditional interactions with the user. You can use all 26 numeric variables as separate and independent conditioners, which makes for a huge number of branches in a program if desired.

There is a big application for PILOT in all kinds of computer aided instructions ranging from the care and feeding of the lesser teat-mouse to clinical pharmacology. If you want to convince your wife (or husband) that the silent monster consuming all of your time and demanding a monthly monetary sacrifice to the finance company is really worth it, try writing a version of PILOT in BASIC. Then all you have to do is chain him/her to a chair for three hours and teach them PILOT. Once the brainwash session is finished, turn them loose and stand aside! ■



**SMALL  
SOFTWARE  
SYSTEM**

## TRS-80 PRODUCTS

**SMALL  
SOFTWARE  
SYSTEM**

RSM-1S: A MACHINE LANGUAGE MONITOR FOR 4K TRS-80'S - \$23.95  
 RSM-2: AN ADVANCED MONITOR FOR 16K TRS-80'S - 26.95  
 RSM-2D: THREE MONITORS FOR TRS-80 DISK SYSTEMS - 29.95

RSM monitors all have 22 commands to control your TRS-80 Z-80 processor. Examine your ROM's, test RAM, enter and execute machine language programs, read and write machine language tapes, and much more! A SYMBOLIC DUMP command disassembles memory into Z-80 mnemonics! Memory may be displayed in HEX or two ASCII formats, and can be EDITED, MOVED, EXCHANGED, VERIFIED, FILLED, ZEROED, TESTED, or SEARCHED for one or two-byte codes!

RSM-2/2D include all above features, plus read and write SYSTEM tapes, enter BREAKPOINTS, PRINT with our TRS232 or the expansion interface, and read and write disk sectors directly! RSM-2 loads at the top of 16K LEVEL I or II. RSM-2D, furnished on disk, has 3 versions for 16K, 32K and 48K.

### BASIC-1P - LEVEL-1 BASIC WITH PRINTING! - \$15.95

Loads into the top 4K of 16K TRS-80's and uses any LEVEL-1 BASIC program or DATA tape (up to 12K in length) without conversion! Plus LLIST and LPRINT for TRS232, RS-232-C or Centronics printers. LPRINT ON and LPRINT OFF prints anything that you see on the screen! All LEVEL-1 abbreviations and functions supported.

### BARRICADE: MACHINE LANGUAGE ACTION GAME FOR TRS-80'S - \$14.95

Break through the 5-wall Barricade with the high-speed ball and keyboard controlled paddle! Trap the ball among the walls and watch it destroy the 100 blocks! Select from 8 speeds, 4 paddle sizes, and 3 ball-angle limits to challenge experts and beginners. 3 scores with the best of each saved to be challenged by other players. NOBODY can achieve the maximum WEIGHTED SCORE of 33,000! 4K LEVEL-I and II.

### AIR RAID: A REAL-TIME TRS-80 SHOOTING GALLERY! - \$14.95

A high speed machine language game where large and small airplanes fly across the screen at different altitudes. A ground based missile launcher is pointed and fired from the keyboard. Aircraft explode dramatically when hit, sometimes destroying other nearby planes! Score is tallied for each hit or miss, and the highest score is saved to be challenged by other players. AIR RAID provides hours of fun for you, and is a super demonstration program for entertaining friends! 4K LEVEL I and II.

THE ELECTRIC PENCIL FOR TRS-80 DISK SYSTEMS - \$150.00  
 THE ELECTRIC PENCIL FOR TRS-80 TAPE SYSTEMS - 99.95

Write text, delete, insert, or move words, lines or paragraphs, save your text on tape (or disk), then print formatted copy with our TRS232 or the Radio Shack Printer (plus RS-232-C with disk version). Right justification, page titling and numbering, transparent cursor and repeating keyboard. Uppercase only, or add lowercase entry and display with minor modification. Tape version runs in LEVEL-I or II 16K computers. A superior word processor for home or business use!

### CP/M OPERATING SYSTEM WITH TRS232 DRIVER - \$145.00

CP/M is a file-oriented disk operating system that provides a common set of utilities for program development and operation. 6 built-in commands, plus many utilities called in from disk. A single editor (ED) is used to create and modify all files. Files may be much longer than your memory! The assembler (ASM) assembles files directly from disk, placing HEX object and assembled PRINT files back onto disk! Also includes DDT (Dynamic Debugging Tool), PIP (Peripheral Interchange Program), and more! CP/M will run on 16K TRS-80's with single disk drives, but 32K and 2 or more drives are recommended. CP/M is a trademark of Digital Research, Inc.

### DCV-1: CONVERT SYSTEM PROGRAMS TO DISK FILES - \$9.95

RSM monitors, Barricade, Air Raid, RSL-1, ESP-1, T-BUG, or nearly any SYSTEM tape shorter than 5K (21K if you have 32K of memory) can now be executed from disk, even if it interferes with TRSDOS! DCV-1 loads system tapes into high memory and adds a block-move routine. TAPEDISK is then used to create a disk file. When accessed from disk, the program loads into high memory, moves itself to its correct address, then jumps there and executes!

### TRS232 PRINTER INTERFACE - \$49.95 (+\$2.00 shipping)

A fully assembled self-contained software-driven output port for TRS-80 printing. Use any RS-232 or 20-mil current loop ASCII printer. The TRS232 is furnished with cassette software and works either with or without the expansion interface! Use the TRS232 with LEVEL-II BASIC, CP/M, BASIC-1P, ELECTRIC PENCIL, RSM-2/2D or your own programs!

### OTHER TRS-80 PRODUCTS

ESP-1: \$29.95 Editor, assembler, and monitor using INTEL 8080 mnemonics.  
 RSL-1: 14.95 Draw patterns, then play Conway's LIFE in machine language.  
 LST-1: 8.00 A disassembled listing of LEVEL-1 BASIC with some comments.

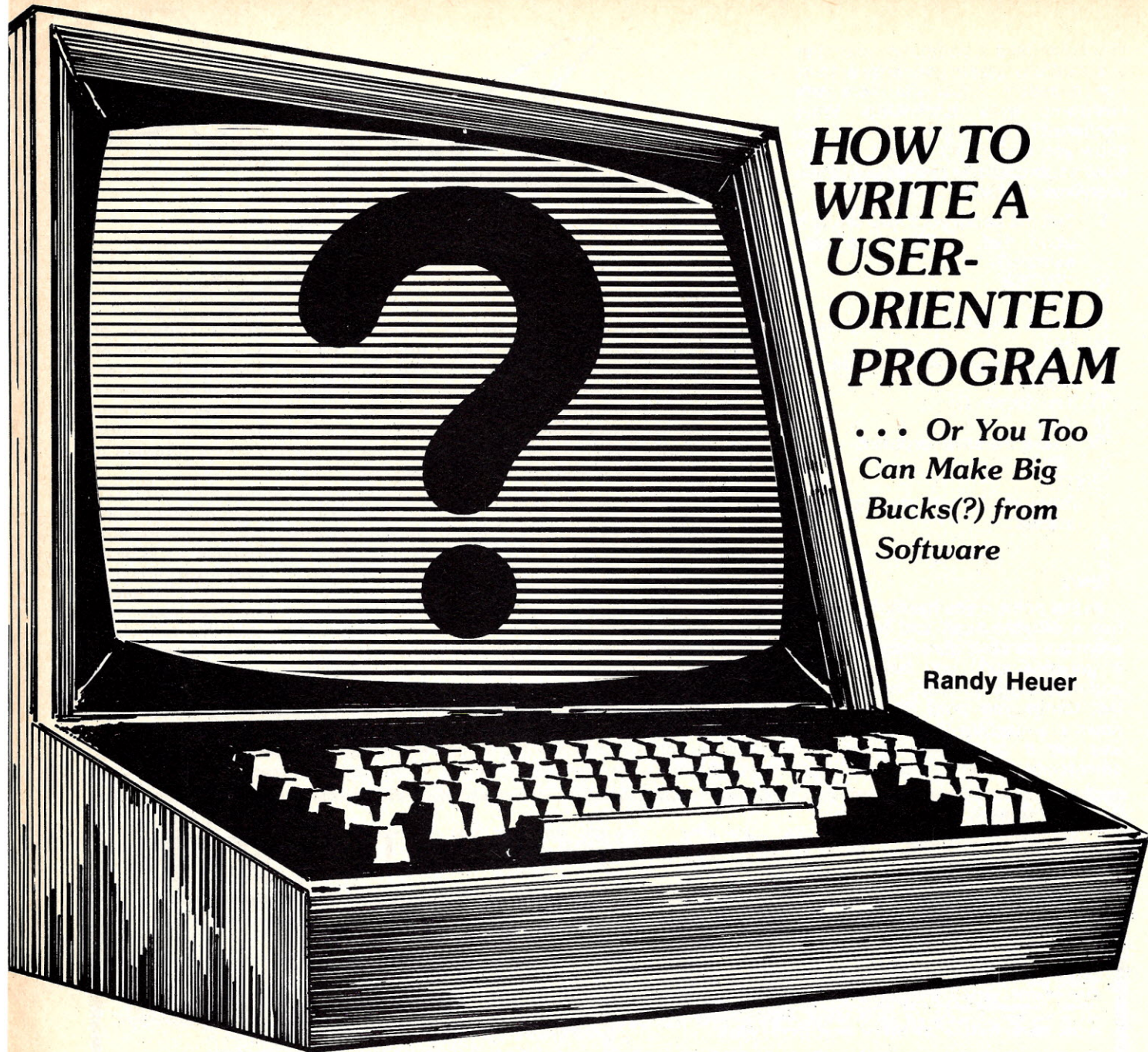
\* CALIFORNIA RESIDENTS ADD 6 PER CENT SALES TAX \*

\* SMALL SYSTEM SOFTWARE \* P.O. BOX 366 \* NEWBURY PARK, CALIF. 91320 \*



\* SMALL SYSTEM SOFTWARE \* P.O. BOX 366 \* NEWBURY PARK, CALIF. 91320 \*





# HOW TO WRITE A USER- ORIENTED PROGRAM

... Or You Too  
Can Make Big  
Bucks(?) from  
Software

Randy Heuer

As part of my job here at *Creative*, I have the privilege of reviewing much of the software submitted to *Creative Computing Software*. I have noticed that most software falls into one of three categories. Some is excellent and very close to production quality as is. Unfortunately, only a small percentage of all software arrives in this condition.

Another small group of software which we receive is extremely poor. This includes programs that won't load, have obvious bugs or are outright copies of published software. Needless to say, these programs are quickly rejected.

The final category into which much of the software submitted falls is a Grey Zone somewhere in between the first two. These programs, obviously

written by competent programmers, often show superior programming effort, but lack the necessary features to put them into the high quality category.

The purpose of this article is to help those people whose programs fall into this Grey Zone. With a little work, most of these programs can be developed into high quality software suitable for acceptance by software companies. While you probably won't get rich selling your software, it certainly is nice to receive an occasional check and to have your name on a commercially produced software package.

## IT'S NOT THAT HARD TO BE ORIGINAL

It is surprising how often I see programs that are based on the same

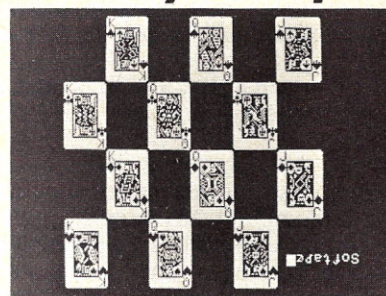
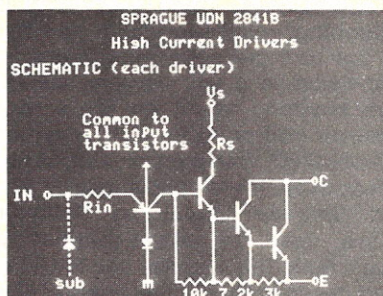
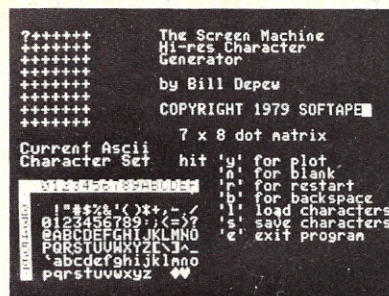
concept or idea. I doubt that in most cases there is an intentional effort to copy someone's program. Instead I feel it is more likely that only the idea was copied, with the hope that the copy will be such a substantial improvement on the current version that some company will instantly adopt the new version.

So there you are, sitting in front of your computer, ready to write the ultimate software package. Now what do you do? You saw a version of Blackjack last week. "Maybe, I can improve upon that," you think.

Well, go ahead if you simply want to enjoy your new version on your own machine, but don't expect a software company to adopt yours just because it's a slight improvement of an existing version. Unless it's a substantial improvement, most companies can't be



# APPLE HI-RES GRAPHICS: The Screen Machine by Softape



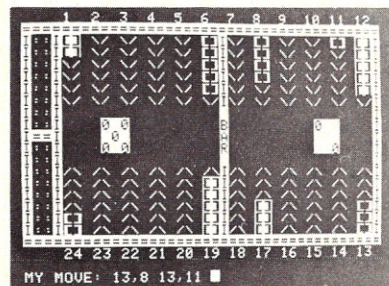
Open the manual and LOAD the cassette. Then get ready to explore the world of Programmable Characters' with the SCREEN MACHINE™. You can now create new character sets — foreign alphabets, electronic symbols and even Hi-Res playing cards, or, use the standard upper and lower case ASCII character set.

The "SCREEN MACHINE" lets you redefine any keyboard character. Just create any symbol using a few easy key strokes and the "SCREEN MACHINE" will assign that symbol to the key of your choice. For example: create a symbol, an upside down "A" and assign it to the keyboard 'A' key. Now every time you press the 'A' key or when the Apple prints an 'A' it will appear upside down. Any shape can be assigned to any key!

The "SCREEN MACHINE" gives you the option of saving your character symbols to disk or tape for later use. There is no complicated 'patching' needed. The SCREEN MACHINE is transparent to your programs. Just print the new character with a basic print statement. The "SCREEN MACHINE" is very easy to use.

Included on the cassette are Apple Hi-Res routines in SOFTAPES prefix format. You can use both Apple's routines and the SCREEN MACHINE to create microcomputing's best graphics.

Cassette, and Documentation, a complete package . . . . . \$19.95



**MICROGAMMON 1.0** Learn, practice and enhance your Backgammon ability with a true competitor. . . . . \$14.95

**APPLE-LIS'NER** Voice recognition Software. Create your own programs which 'listen' and understand 31 spoken words — English or Foreign. No hardware needed. . . . . \$19.95

**APPLE TALKER** Your Apple's voice. Create programs which talk to you in English or Spanish or any language. . . . . \$15.95

**JUPITER EXPRESS** Command your ship thru the hazards of the Asteroid belt between Mars and Jupiter. . . . . \$9.95

**FORTE'** A music language, written like basic, you use line numbers for your notes. You can trace line numbers or notes. You can even print the words of any song. Save your song to your Disk. . . \$19.95

**FORTH IC** Is the creation of Wm. Graves. This language gives you faster execution of programs than basic and is easier to program than machine language. Our 100 page manual will teach you everything you will need. **FORTH IC** comes complete with demo programs on one Apple diskette. . . . . \$49.95

**WHERE TO GET IT:** Look for the SOFTAPE Software display in your local computer store. Apple dealers throughout the United States, Canada, South America, Europe and Australia carry the SOFTAPE Software line of quality products.

If your local dealer is sold out of SOFTAPE Software you can order it direct from us by check or Visa/Master Charge. If you have any questions please call us at:



1-213-985-5763

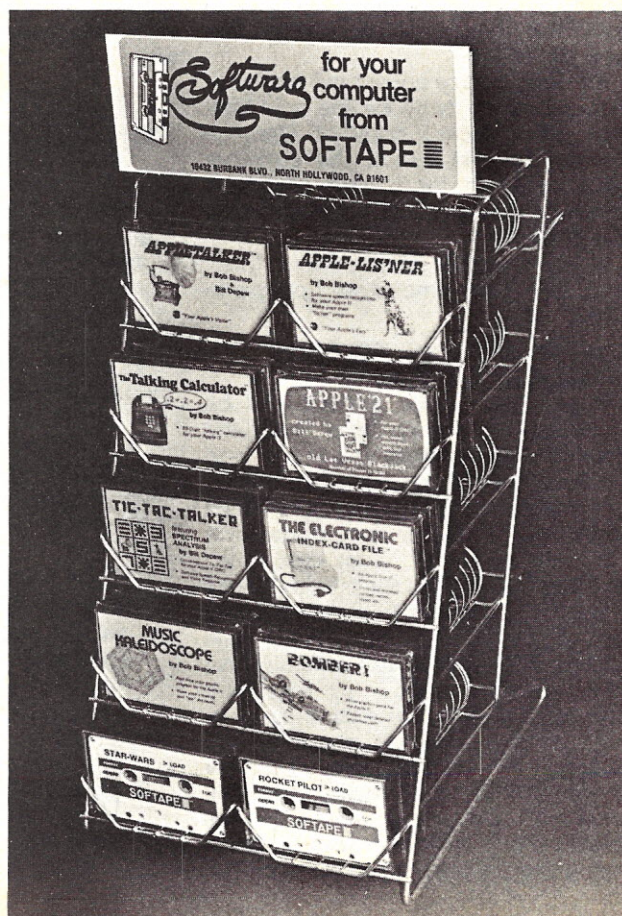


Or mail your order to the address below. We'll add your name to our mailing list for free literature and announcements of new products.

## SOFTAPE

10432 Burbank Blvd. • North Hollywood, CA 91601

CIRCLE 196 ON READER SERVICE CARD





bothered with the problems associated with changing tape masters, instruction booklets and depleting present stocks.

So, I've convinced you to go and do something original. "Now what do I do?"

Start thinking. First look at the graphic character set of your computer if your computer has special graphic characters. Often this is the jumping off point for a software idea—particularly a game. If your computer doesn't have special characters (TRS-80, Apple II, etc.), create your own with whatever graphic capabilities your machine has available.

Books are frequently a good source of ideas. Game encyclopedias such as "The Way to Play" (Bantam) are excellent. But don't restrict yourself to obvious sources of games—let your mind wander and consider the programming possibilities in "The Hobbit," "The Hugo Winners," Fixx's "Book of Running," "The Wizard of Oz" series, "The I Hate Mathematics Book" and hundreds of others.

Slowly but surely something is bound to come out of your experiments. Now is the time to start scribbling notes on your idea. They need not be too complex or detailed at this point; you only need a general idea.

Now stop for a moment and look at what you want to do. Is it feasible with the memory or machine capabilities you have in your system? There's no point in trying to simulate World War II on a 4K TRS-80.

All right, you're convinced that your idea will work. Now for the acid test. Pick up a recent copy of *Creative Computing* and check the software advertisements for similar programs presently available. Is your idea new and different?

If you can honestly answer "yes," then now is the time to start programming.

#### **"OH NO! DO I HAVE TO WRITE INTELLIBLE CODE?"**

If you want your software to be accepted, the answer is an emphatic "Yes!" It will also help you in the long run when it's debug time. More important, believe it or not, it will make things easier for you as your work progresses.

In higher level languages (i.e., BASIC), this implies the maximum use of subroutines. I can hear the moaning and crying already, but please read further. Subroutines can actually save you memory space if they are developed wisely. For example, if you want to move objects about on the screen in various directions, write a set of subroutines to move any character or set of characters about on the screen. Then test them with a simple main program that lets you change the

moving character without changing the subroutines. Once everything is functioning, you'll appreciate the effort you put into the subroutine development because it will be very easy to move anything about on the screen whenever you need to, just by typing GOSUB 4700. With a set of subroutines such as those mentioned above, I have, in a *Creative Computing Software* release, used the same routines to move a tank, fire missiles and have the computer search for the enemy. Use subroutines to your advantage in this manner.

Other good programming practices should also be employed as much as possible. REM statements should be used to identify major sections of code and to explain code that is difficult to follow. You don't have to explain every variable, but outlining the major variables will be helpful to a software reviewer. Obviously the number of REM statements you can employ is limited by the memory of your computer and the complexity of your program.

In general then, you should attempt to write your code as clearly as possible. Use of REM statements and subroutines will work to your advantage in the long run.

#### **"IT WORKS! AM I DONE NOW?"**

Not yet. Unfortunately a lot of people stop at this point, mail off their software to the various companies, and start on their next project. These people receive lots of software rejections, and very often, I suppose, don't understand why.

## **Ten Rules For Writing User-Oriented Programs**

Much of the software in the personal computing field is unprofessional, "untidy," and difficult to use. Even some well-written software does not "invite" the user back after a first trial run.

However, experience with both kids and adults indicates that software can be written which overcomes the novice's fear of computers and which guides the user to successful completion of his or her run. Also, it need not be boring to the more experienced user.

Here are ten brief "rules" for writing a user-oriented program:

1. **Personalization.** Periodically, the program should use the user's name in output remarks, or even humorous asides that may have little or nothing to do with the program.
2. **Instructions.** Self-instructing when possible. Use demonstration and examples not exposition.

So, let's see what happens once the program reaches the software reviewer's hands.

It's 4:00 p.m. and our software reviewer has been trying out programs for most of the day. It's been about average: two or three excellent submissions have shown up in the muddle of thirty or so programs. Our reviewer reaches into the box of cassettes and grabs Sam Q. Hopeful's tape. It takes our reviewer three tries to load Sam's tape since the volume settings on the recorders were different.

When he finally gets it loaded and starts to run it, the screen blanks out and only an input prompt appears. Our reviewer is confused. He looks at Sam's cover letter—no help there. So he types in an 'F.' The computer responds "Redo from Start?" Our reviewer is not impressed. He types in a '5,' and suddenly things start happening all over the screen; tanks blowing up, airplanes fly across, etc. Our reviewer, perplexed by all this action, tries pressing several different keys with no obvious results until suddenly the screen blanks out, the computer prints, "YOU HAVE BEEN DESTROYED BY AN ENEMY MISSILE!" and the program stops.

Our reviewer, less impressed than ever, gives it another try with the same result. Sam's tape goes into the reject pile.

Although this is an extreme case, it does happen on a fairly regular basis. Sam's program may have been excellent, but it never really had a chance. Let's see what Sam did wrong.

3. **Help hints.** Should be available throughout the run whenever the user types the word "help" or "-1."
4. **Paging.** Use paging, not scrolling. When user presses any key, clear screen and put up new page.
5. **Graphics.** Color, animation, simple plots or abstract patterns can be used to enhance most programs.
6. **Skill Levels.** Two or more skill levels should be available in every game or simulation.
7. **"Attract Mode."** A mode in which the program plays on the screen while the computer is not being used.
8. **Humor.** The program should act "human" but not sarcastic.
9. **Avoid Violence.** A game lobbing custard cream pies instead of high energy explosives is preferred.
10. **Reinforcement.** Praise the winner of a game and encourage the loser.

**David Ahl**



## User Program can't...

The first thing Sam's program lacked was complete instructions. Which should have been included in PRINT statements at the beginning of the run. If more than one screen "page" of instruction is required, the user should be instructed to press a key to go to the next page and the screen should be cleared before printing the second page. With the exception of very complex programs, all instructions should be presented on the screen. No separate instructions should be necessary. Make it your goal for anyone (particularly non-computer types) to be able to use your program without outside help.

Speaking of help, this is something else that your program should provide. Help comes in two forms. The first is in direct response to the user's call. In other words, your program should allow the user to request help regarding input or actions. For example, if your program asks, "Enter Number of Ducks?", you should allow the user to request help and have the computer respond with something like, "Use between 1 and 50 ducks." You needn't supply the correct value (i.e., "use 42 ducks"), but give the user a reasonable idea of what he should try.

The second type of help is needed when the user enters a totally unrealistic value in response to a prompt. In the example above, if the user enters "37" or "400000," rather than allow the program to proceed, print the appropriate help message and have the user re-enter the value. This avoids much frustration in trying to get satisfactory results.

If Sam's program had included complete instructions and a help feature, it would at least have stood a chance with our reviewer.

What can you do to further increase your program's chances of being accepted? Try personalizing the program by asking the user his or her name, and from time to time print the user's name on the screen in a humorous remark. Try to make your computer seem more "friendly." Avoid the "It Does Not Compute" syndrome.

Use graphic features wherever possible to make the program more enjoyable for the user. An "attract mode," in which the screen continuously demonstrates some action in the program, is a very appropriate use of graphic features. An "attract mode" is incorporated into most of the coin-operated video arcade games to demonstrate how the game is played before the user spends his or her quarter. A similar feature can easily be

incorporated into most computer software if subroutines have been used extensively during the program development. In this case, a picture can be worth a thousand words in the instructions.

### NOW SEND YOUR SOFTWARE!

If you have followed these guidelines and your program is original, incorporates good programming practices and is as user-proof as possible, chances are you have developed an excellent program. To give it the final test, try it on your family and friends. Don't tell them how to play. Sit back and let them try it with no outside assistance. If they can't get it going successfully, you should refine it until they can.

Once this is accomplished, you are finally ready to submit your software. While there are no guarantees that your software will be accepted, you can be proud of the high quality application for your computer you have produced. Happy programming! ■



# CP/M®+TRS-80®

## The CP/M Operating System now available for Radio Shack's TRS-80

### CP/M OPERATING SYSTEM

- Editor, Assembler, Debugger, and Utilities
  - For 8080 and Z-80 Systems
  - Up to four floppy disks
  - Documentation includes:
    - CP/M Features and Facilities
    - CP/M Editor Manual
    - CP/M Assembler Manual
    - CP/M Debugger Manual
    - CP/M Interface Guide
    - CP/M Alteration Guide
- CP/M System Diskette and Documentation (Set of 6 manuals) for \$150.  
CP/M Documentation (Set of 6 manuals) only \$25.

### MAC™ MACRO ASSEMBLER

- Compatible with new Intel Macro standard
  - Complete guide to Macro Applications
- MAC Diskette and Manual for \$150.

### SID™ SYMBOLIC INSTRUCTION DEBUGGER

- Symbolic memory reference
  - Built-in assembler/disassembler
- SID Diskette and Manual for \$125.

### TEX™ TEXT FORMATTER

- Powerful text formatting capabilities
  - Text prepared using CP/M Editor
- TEX Diskette and Manual for \$125.

### HIGH-LEVEL LANGUAGES

- Basic
- Fortran
- Cobol
- Call or write for information

### USER'S GROUP

- 35 disks with utilities, games and applications
- Call or write for information

## FMG CORPORATION

P.O. Box 16020 • Fort Worth, TX 76133 • (817) 738-0251

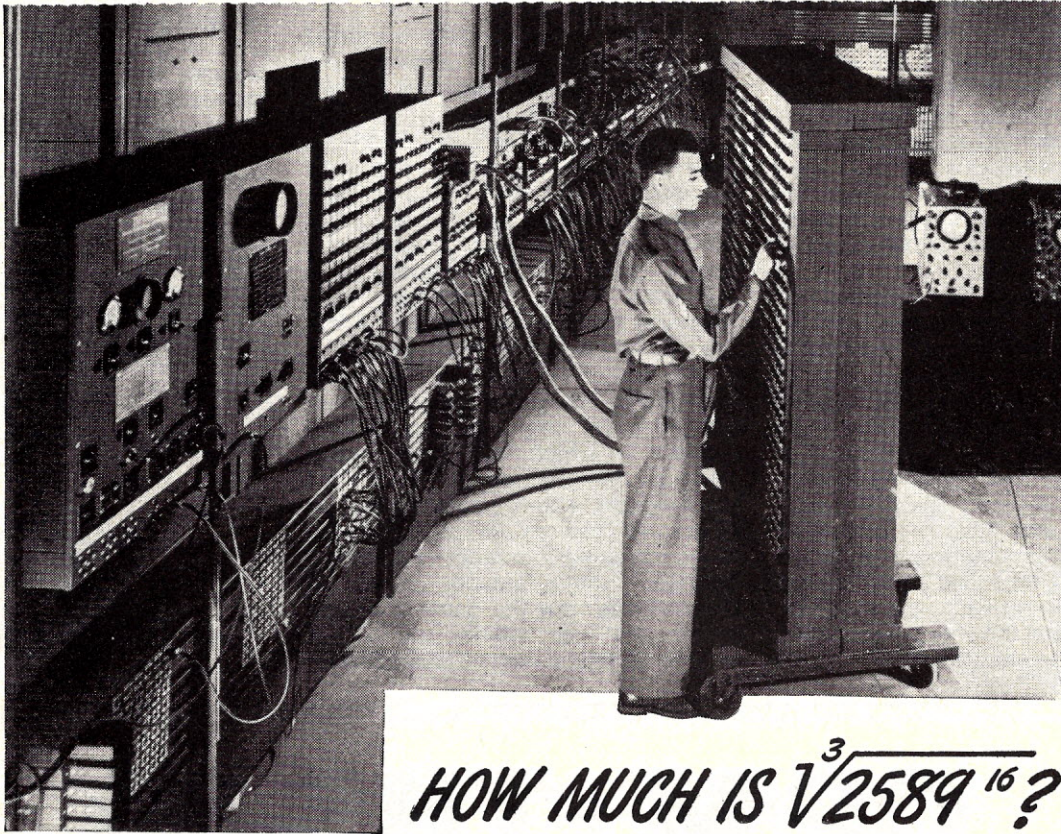
CP/M is a registered trademark of Digital Research Corp.

TRS-80 is a registered trademark of Radio Shack.



Here is what must be one of the earliest, if not the earliest computer recruitment/employment ads! (Note that the word "computer" isn't even mentioned.) This appeared in October 1946 in *Popular Science* and other magazines. We've come a long way in only a single generation (human)!

Submitted by Lazlo Toth, 49 E. New Lenox Rd., Pittsfield, MA 01201.



*HOW MUCH IS  $\sqrt[3]{2589^{16}}$ ?*

**The Army's ENIAC can give you the answer in a fraction of a second!**

Think that's a stumper? You should see *some* of the ENIAC's problems! Brain twisters that if put to paper would run off this page and feet beyond . . . addition, subtraction, multiplication, division—square root, cube root, any root. Solved by an incredibly complex system of circuits operating 18,000 electronic tubes and tipping the scales at 30 tons!

The ENIAC is symbolic of many amazing Army devices with a brilliant future for you! The new Regular Army needs men with aptitude for scientific work, and as one of the first trained in the post-war era, you stand to get in on the ground floor of important jobs

**YOUR REGULAR ARMY SERVES THE NATION  
AND MANKIND IN WAR AND PEACE**

which have never before existed. You'll find that an Army career pays off.

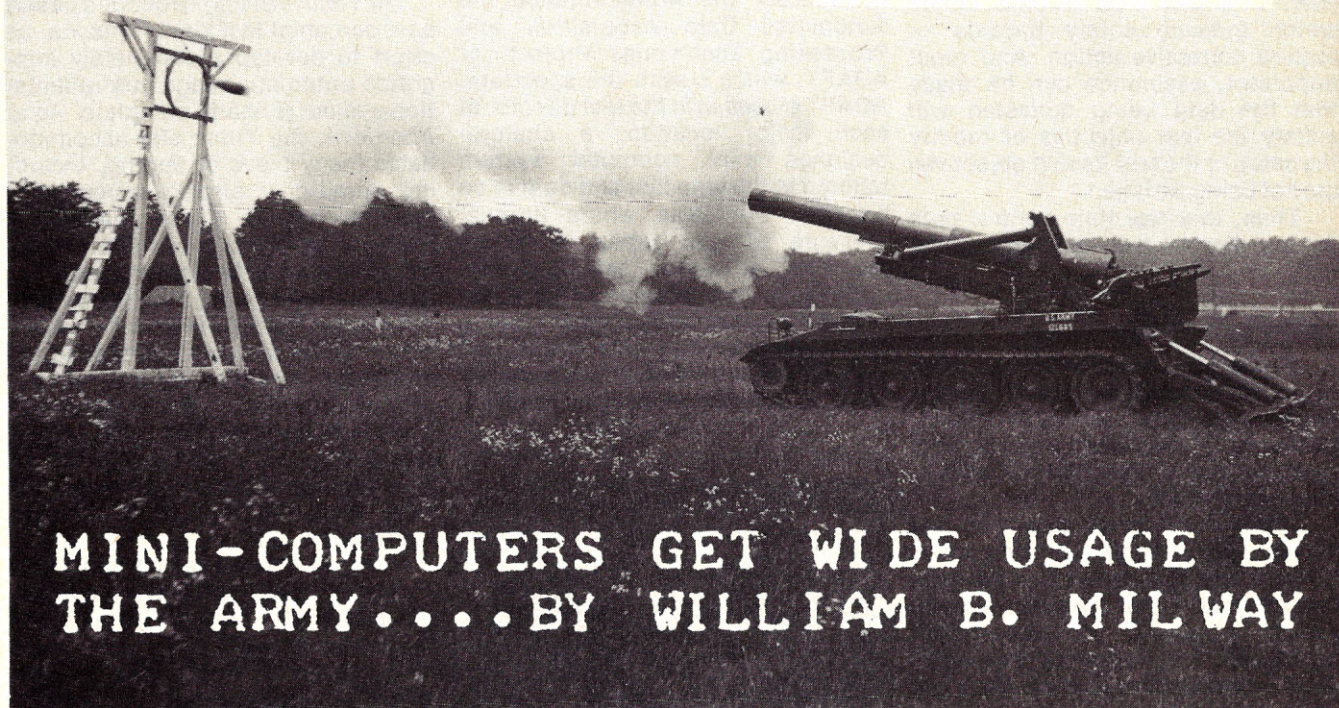
The most attractive fields are filling quickly. Get into the swim while the getting's good! 1½, 2 and 3 year enlistments are open in the Regular Army to ambitious young men 18 to 34 (17 with parents' consent) who are otherwise qualified. If you enlist for 3 years, you may choose your own branch of the service, of those still open. Get full details at your nearest Army Recruiting Station.

**A GOOD JOB FOR YOU**  
**U. S. Army**  
**CHOOSE THIS**  
**FINE PROFESSION NOW!**

OCT.  
1946



The first digital computer, ENIAC, was developed for the US Army to calculate artillery trajectory tables. Today computers are playing an important part in Army testing of artillery, and other applications.



## MINI-COMPUTERS GET WIDE USAGE BY THE ARMY....BY WILLIAM B. MILWAY

Scientists the world over were ecstatic when the U.S. Army introduced the first computer more than 30 years ago. Now, it is the Army's turn to exalt as refinements of the computer, much by private industry, begin to yield dramatic advances for military research and development.

It was August, 1947, when the Electronic Numerical Integrator and Computer, or ENIAC, was unveiled at Aberdeen Proving Ground, MD. The computer had been built under a 1943 Army contract at the University of Pennsylvania to facilitate wartime assembly of numerous artillery firing tables and aircraft bombing charts.

ENIAC weighed 30 tons and occupied 15,000 square feet. Successive computers have also been large, although a trend of the past decade has been toward minicomputers and microprocessors. Ultimately, some of the large computer capability has been fit into fist-sized packs.

To the Army, the trend toward smaller computer equipment means faster research and development—whether testing new weapons, tanks, and missiles, or seeking ways to test waterways for pollution. Today's smaller computer equipment allows immediate processing on site, by dedicated, transportable computers as more avenues open for bringing technology out of controlled laboratory settings into more realistic field

situations.

For example, safety and control for missile flights at White Sands Missile Range, NM, prompted early real time computers in the command/destruct link. Decisions that a missile may require destruction before wandering off course have to be made before the fact. And, because such capabilities required much computer power in the early days, full-blown maxicomputers were the only answer for many years.

Other requirements, such as artillery, vehicle and aerial weapon testing, where real time was not so critical, normally could not justify the high investment of a dedicated, full scale computer. Now, minicomputer power and cost, puts the advantages of real time data within the grasp of all testing.

### Test Director in Control

The value of real time data to a weapons test director is much greater than generally imagined. By having the critical information available during the test, the director can control the operation and assure objectives are being met. For example, a typical artillery test might consist of firing under specified conditions and recording data on performance. The objective would be

to determine something about the weapon's performance, perhaps velocity and accuracy of a new projectile. Today, the objective and data necessary to pursue that objective already have been determined, and a detailed plan of testing is available before the test begins.

Before minicomputer-based, on-line processing, the test director had a very limited knowledge of how the data he was collecting would contribute to the test objective. With only a crude, quick look at raw data, there was comparatively no control of the test. Often, the discovery was made several days later, that some information critical to the test objective had not been obtained. The result was the need to repeat portions of the firing. This meant wheeling the truck-pulled guns back to the ranges, reforming the hundreds of soldiers required to man the guns, deliver the ammunition, set up radio nets, go down range to observe and adjust the rounds fired, safety patrols, etc. Quite an expense in both manpower and dollars. In addition, lengthy delays needed for production and deployment decisions might result.

The minicomputer allows the test director to observe processed data on one round before the next is fired. On a graphic display one can call up various plots of parameters against time, range, or velocity. The test



## Army con't...

director can also call up data from previous rounds on this test or historical data stored in memory on similar tests conducted last month or last year. One can look at data trends which indicate safety hazards or require corrective action. And most important, assurance can be made that the data being collected will satisfy the test objective or modify the setup or the test itself if objectives are not being satisfied.

Thus, this real time control puts the test director truly in charge of the test.

### Army Test Facilities

A pioneer effort in on-line mini-computer systems has been accomplished at Jefferson Proving Ground, Madison, IN, the location for acceptance testing of large caliber ammunition for the Army.

Technicians enter data into the system, either through a keyboard or directly from measuring instruments. Impact location, for example, is a very critical parameter in ammunition evaluation. The impact of a round is determined by triangulation from two or more observers using surveying instruments to measure the line of sight. A direct interface with a special surveying theodolite allows digital azimuth and elevation angle data. The computer can then determine the impact and compute range, deflection, and other data. Pre-established acceptance limits can be programmed to indicate any problems. Data from all measurements can be processed and displayed in a meaningful form immediately after the round is fired. As the test progresses, averages and trends can be displayed. In addition, a data base from previous tests is available on the cathode ray tube. The final payoff from the system is the complete data record in final form which is available in hard copy as soon as a day's firing is completed.

Aberdeen Proving Ground, MD, is where the Army directs tests for such

items as small arms, eight-inch guns, tanks, trucks, military uniforms and boots, generators, and boats. To automate the data collection and analysis from this span, a multi-element, integrated system is required. So, the Army initiated the Automated Data Acquisition and Processing Techniques Project, or ADAPT, which covers the spectrum. ADAPT places with the test director at each major location, a custom-designed mini computer system tailored to the type test and data to be handled. For tests where internal pressure of gun tubes is to be recorded, a unique sampling rate digitizer is incorporated. This automatically measures the rate of change of a parameter and sets the digital sample rate to preserve data integrity while minimizing storage and recording space. The digitizing rate is automatically set from 80 to 800 khz

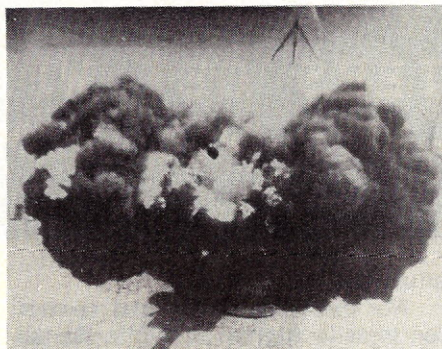


Photo 1: An artillery shell frozen in flight by the camera as it leaves a cannon at Aberdeen Proving Ground.

as the data varies. In addition, the module has pretrigger memory so that no useful information will be lost.

Full duplex circuits connect site systems to a central process control mini which monitors the system and maintains control. This is linked, in turn, to a larger mini which stores data base information downloaded from the main computer and does the more complex calculations. Skilled technical experts are close to this computer and may be called in to help the test director with data analysis and interpretation in near real time. The ADAPT system gives the test director computing power, expert opinions and data base information all available on the graphic display right at the test location. One can process and manipulate data in a variety of ways. The system output data are in final form for direct inclusion in test reports. ADAPT also handles the important and time-consuming calibration and adjustment of test instrumentation.

The ADAPT system is scheduled to be fully operational in mid-1979.

Prototype test site systems already have been used on such tests as the XM1 tank and have proved the utility of the concept while saving the Army up to a quarter of a million dollars on a single test.

At Yuma Proving Ground, a desert environmental test site in Arizona, an effort to develop a completely integrated automatic range instrumentation system is nearly complete. As at Aberdeen, the Yuma site accommodates many types of testing, including munitions, aircraft armaments, vehicles and a global navigation system. Beginning in 1973, Yuma began to automate aircraft armament testing. Three major test complexes will be established in which individual instrumentation will operate as an integrated data acquisition and reduction system. The systems will permit a flow of raw data from the test site through data processing to real time display and quick-look to final data output with minimal human intervention.

There are three areas of the Yuma Proving Ground system which deserve particular mention. The first is the extensive use of integrated video/ADPA systems which replace conventional photo-optics. These systems provide digital data directly from the optical information and are critical to range automation since much use of imaging systems is required. much use of imaging systems is required.

The second concept is the linking of individual instruments containing what would normally be dedicated ADPE, into a ring network that maximizes computer capability. Most of the range instruments—laser trackers, radars, etc.—need a fairly powerful minicomputer. By linking these individual computers and a central computer complex at the Range Operations Center, strengths

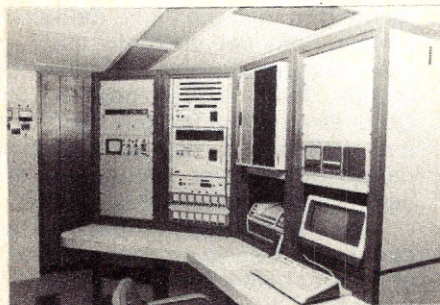


Photo 2: The remote site terminal for data acquisition from artillery testing.

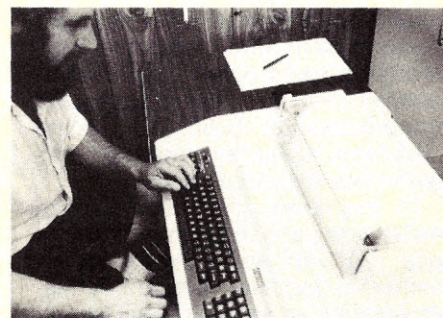


Photo 3: Dr. Dave Gruber, a research associate at the Virginia Polytechnic Institute, receives and analyzes data from the minicomputer housed in the Army's biomonitoring trailer at the Radford Army Ammunition Plant. VPI is involved in this cooperative effort to monitor wastewater from the plant effluent. The computer is a DEC PDP/11 with Decwriter.



of utility and reliability can be achieved. Data traffic flows around the ring in one direction with each ring interface unit passing the data on to the next. When a ring interface recognizes data for its associated mini, it shunts the data to that mini. Should a mini fail or be out of service, the interface unit automatically and instantaneously will substitute another mini which has a lower priority task. Thus, a retest can be avoided should a computer fail during a test. This system provides the power of a single large computer while not compromising the ability of each instrument to operate in a standalone mode.

The third concept is a display network built into the ring system. Each display is dedicated to individual tasks in real time, supporting independent range complexes. The concept provides real time or near real time data display for each range complex. For example, a complex munitions test would include radar, velocity, range, deflection, internal ballistics, telemetry, and tracking mount instrumentation support. All instrumentation would be linked to the central ring network with data distributed to a single major display with a minimum of two CRT's. Each display can be structured with software to support the test as required by the program manager and project engineer.

Other features of the Yuma system include the use of ADPA for resource scheduling and report automation. The ability of the ring network to function in real time has been demonstrated on the complex Global Positioning System test for the U.S. Air Force. A critical requirement in this test is to obtain the best estimate of trajectory data in which tracking information from a number of instruments are merged in near real time. Because the system uses satellites to determine position, the testing is limited by satellite visibility from the Yuma area and data must be available for analysis within a few hours so that the test can be modified to take best advantage of the next period of satellite visibility. This test could not have been supported without the real time data system.

### The Computer and the Environment

The Cold Regions Test Center at Fort Greeley, Alaska, has a unique problem for computers in that many tests must be conducted under extreme environmental conditions: temperatures as low as -60°F, high winds, and low light levels. In the past, data had to be recorded

manually and the bulky cold weather protective gear made this quite difficult.

To ease the problem, the Army developed the Rapid Collection and Analysis of Data (RCAD) which automates major data collection bottlenecks at the center. RCAD functions much as the systems previously mentioned, with direct data entry from instruments wherever possible.

Cold Regions' tests generally take advantage of environmental conditions which occur for only short periods of time. Because these conditions occur at irregular and unpredictable intervals, the rapid analysis of data is a must if testing is to be performed efficiently. RCAD can provide quick-look data on progress of the test in near real time, thus allowing the test director to modify the test and take advantage of the environmental conditions.

A minicomputer is also the nerve center in an experimental field method of monitoring water pollution being tried out near the Army Ammunition Depot on the New River in Radford, Virginia.

Sunfish are kept in a series of special tanks and a portion of the plant effluent is diverted to run through them at a constant flow.

A biomonitoring system measures the breathing rates of the fish.

When exposed to a sublethal toxic condition, as would happen in the case of an acid spill or other system upset, the breathing rates change. The fish, swimming between two electrodes, generate a bioelectric signal as they swim, thus indicating the changes. The minicomputer provides continuous information that enables specialists to recommend additional wastewater treatment when necessary.

The new method also includes a wastewater distribution and dilution system with the minicomputer collecting, storing and analyzing the data. Everything is housed in a single trailer so that it can be moved to any location. Immediate warning is given when the water quality is a problem, thus saving considerable cost and time over conventional monitoring.

While the soldier's need for the best products defense dollars can buy remains paramount, the Army also recognizes that demand for progress can outstrip resources and economies have to be sought at every turn. This is why the recent computer trends are so valuable to the Army. □

William E. Milway is an Engineer with the Instrumentation Directorate at the US Army Test & Evaluation Command, Aberdeen Proving Ground, Maryland.

## Build The World's Most Powerful 8-Bit Computer

### Featuring The Famous Intel 8085!

## Explorer/85™

Starting for just \$129.95 you can now build yourself a sophisticated, state-of-the-art computer that can be expanded to a level suitable for industrial, business and commercial use. You learn as you go... in small, easy-to-understand, inexpensive levels!

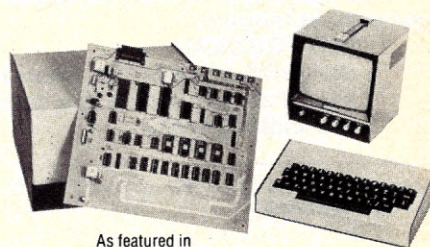
- Features Intel 8085 cpu/100% compatible with 8080A software!
- Onboard S-100 bus (up to 6 slots)!
- Onboard RAM and ROM expansion!
- Built-in deluxe 2K Monitor/Operating ROM!
- Cassette/RS 232 or 20 ma./4-1/2 8-bit parallel I/O and timer all on beginner's Level "A" system!

EXPLORER/85 gives you "big computer" features immediately, without turning you into an appliance operator, doomed to run pre-developed software for life. Simply connect EXPLORER to a terminal, video monitor or tv set and 8 volt power supply and start running programs, the very first night! Level "A" teaches you machine language and computer fundamentals. It lets you run exercise programs including programs to examine the cpu registers, examine memory, fill memory, move memory and make up games. You can load and print back these programs on an ordinary tape cassette—and display your efforts on any tv screen, video monitor or printer. (\$8.95 RF modulator required for tv use.) The simplified architecture of the Intel 8085 makes EXPLORER far easier to understand than computers using the older, more complex but less powerful 8080A. Then, when you're ready, EXPLORER can be expanded—by you—to rival the power of any 8-bit computer on earth. Or you can customize it to perform a dedicated task, thanks to onboard

prototyping, RAM and ROM expansion capabilities.

**LEVEL "A" SPECIFICATIONS**

EXPLORER's Level "A" system features an advanced Intel 8085 cpu, which is 50% faster than its 8080A predecessor, yet 100% compatible with 8080A software... which, you'll discover, exists by the ton. "Big computer" features include an 8355 ROM with 2K deluxe monitor/operating system which has two programmable 8-bit bi-directional parallel I/O ports, built-in cassette interface with tape control circuitry to allow labeling cassette files, and commands which include: "display contents of memory... run at user location (go to)... insert data... move contents of memory... examine registers individually or all... fill command (to fill the contents of memory with any variable), automatic baud rate selection, programmable characters per line display output for font, and more! An 8155 RAM—I/O chip contains 256 bytes of RAM, two programmable 8-bit bi-directional and one programmable 6-bit bi-directional I/O ports plus programmable 14-bit binary counter/timer, user interrupt and reset switches. Onboard expansion provisions exist for up to six S-100 boards, 4K of RAM and 8K of ROM, PROM or EPROM.



As featured in  
**POPULAR ELECTRONICS**  
EXPLORER/85 shown with Video Monitor and Keyboard/Video Terminal.

**CHOICE OF HEX KEYPAD OR TERMINAL INPUT**

If you plan to customize EXPLORER for dedicated use, we recommend that you order hex keypad input. But, if you are planning to go whole hog and blow EXPLORER up into a full size, state-of-the-art system with 8K or extended basic (coming soon), up to 64K of memory, floppy disks, telephone interface, printers, and all sorts of S-100 plug-ins—you'll be better off with the Keyboard/Video Terminal input. The \$149.95 EXPLORER Keyboard/Video Terminal includes full ASCII decoding with 128 ASCII upper/lower case set, 96 printable characters, onboard regulators and selectable display formats—32x16 for tv set or 64x16 for video monitor (not included).

**EXPAND EXPLORER, LEVEL-BY-LEVEL**

Level "B", at \$49.95, adds S-100 signals plus onboard RAM/ROM decoding. Includes all parts necessary to generate the signals for S-100 bus accessories. Just add two S-100 bus connectors and you have a complete S-100 compatible computer with a world of add-ons at your fingertips. Choose from hundreds of products to satisfy your individual needs. Level "B" kit also includes the address decoders for onboard RAM and ROM expansion, which are addressable anywhere in the 65K field.

Level "C" expansion, at \$39.95, expands the S-100 bus to allow a total of six S-100 cards to be plugged into EXPLORER's motherboard and contained in EXPLORER's steel cabinet. Includes all hardware, mounting brackets, board guides, etc. Just add the number of S-100 bus connectors you need.

Level "D" expansion, at \$69.95, gives you 4K of onboard static RAM utilizing 2114 IC's. Your board will also accept four 2716 EPROM's, which can be purchased separately. You now have an advanced mainframe that can be customized with the peripherals of your choice to fit any (or all) specific requirements. Each level of EXPLORER is separately regulated for the ultimate in stability. Factory service is available from Netronics. Order your EXPLORER today!

**ORDER FROM THIS COUPON TODAY!**

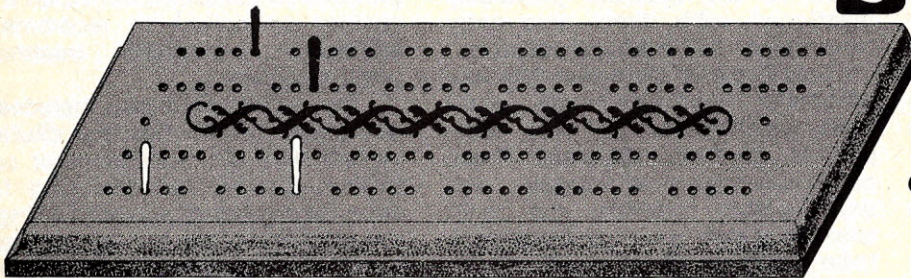
Netronics R&D Ltd., Dept CC-5, 333 Litchfield Road, New Milford, CT 06676

<input type="checkbox"/> Level "A" EXPLORER/85 kit (specify <input type="checkbox"/> terminal or <input type="checkbox"/> hex keypad input), \$129.95 plus \$3 p/h.	<input type="checkbox"/> Deluxe Steel Cabinet for EXPLORER/85, \$39.95 plus \$3 p/h.
<input type="checkbox"/> Power Supply kit, 5 amp, ± 8 volt, \$34.95 plus \$2 p/h.	<input type="checkbox"/> Deluxe Steel Cabinet for Keyboard/Video Terminal, \$19.95 plus \$2.50 p/h.
<input type="checkbox"/> Intel 8085 User's Manual, \$7.50 p/d.	<input type="checkbox"/> RF Modulator kit, \$8.95 p/d.
<input type="checkbox"/> ASCII Keyboard/Video Terminal kit, \$149.95 plus \$3 p/h.	<input type="checkbox"/> Total Enclosed (Conn. res. add tax) \$
<input type="checkbox"/> Hex Keypad kit for hex version, \$69.95 plus \$2 p/h.	<input type="checkbox"/> VISA <input type="checkbox"/> Master Charge <input type="checkbox"/> Exp. Date
<input type="checkbox"/> Level "B" S-100/Onboard RAM/ROM Decoder kit (less S-100 connectors), \$49.95 plus \$2 p/h.	Account #
<input type="checkbox"/> Level "C" S-100 5-Card Expander kit (less connectors), \$39.95 plus \$2 p/h.	<b>PHONE ORDERS CALL (203) 354-9375</b>
<input type="checkbox"/> S-100 Bus Connectors (gold), \$4.85 each.	Print Name
<input type="checkbox"/> Level "D" 4K Onboard RAM kit, \$69.95 plus \$2 p/h.	Address
	City
	State Zip

DEALER INQUIRIES INVITED



# Cribbage



## Sheppard Yarrow

If you happen to be a cribbage fanatic, you must know the frustration of wanting to play and not being able to find an opponent. Well, never again; CRIBBAGE is always waiting to accept the challenge. For those of you who are not cribbage players, the rules can be found in any good book of card games.

The specifics of the computer game are as follows:

1. CUT FOR DEAL:  
reply with a number between 1 and 52 corresponding to a card in a shuffled deck.

Sheppard Yarrow, 6513 Farmingdale Court, Derwood, MD 20855.

2. DISCARDS:  
the 6 cards will be numbered 1 to 6; reply with the card numbers - a, b.
3. YOUR PLAY:  
reply with the card number or GO.

The computer will shuffle, deal, generate the up card, keep track of the running sum, and credit all points earned during the play of the hand. It won't let you exceed 31 but does **not** check to see if you could have played a card when you responded GO. There is no strategy involved in the program, other than to keep the cards which yield the most points, and play the card which will score the most points. The rest is the luck of the up card.

CRIBBAGE is written in IBM BASIC for execution under TSO on a 370/158.

### Conversion Notes:

1. MAT READ  
Loads arrays from DATA statements, in the order of rows by columns. For instance, MAT READ V is equivalent to:  
FOR I = 1 TO 15  
FOR J = 1 TO 7  
READ V(I, J)  
NEXT J  
NEXT I
2. STR\$  
Refers to a substring. Its purpose in lines 40-140 is to help set up an array with the names of all 52 cards.:
3. PRINT USING  
Formats output using an image, usually in the following line. Generally the image line is printed as it appears, but with the variables from the PRINT USING statement plugged in where the # signs appear in the image. (Compare the LIST and RUN).
4. MAX and MIN RND  
Pick the largest and smallest of two values. Returns a random value  $0 < x < 1$ .

```
PLEASE CUT FOR DEAL ?
21
YOUR CARD IS THE 9 OF SPADES
MY CARD IS THE A OF CLUBS
I AM DEALING

YOUR CARDS ARE

(1) Q OF SPADES
(2) 3 OF DIAMONDS
(3) A OF HEARTS
(4) 5 OF SPADES
(5) 3 OF CLUBS
(6) 5 OF HEARTS

YOUR DISCARDS ?
2,3

THE UP CARD IS THE 3 OF SPADES

YOUR PLAY ?
5
YOU PLAYED THE 3 SUM= 3 POINTS= 0
MY CARD IS THE J SUM=13 POINTS= 0
YOUR PLAY ?
1
YOU PLAYED THE Q SUM=23 POINTS= 0
MY CARD IS THE 4 SUM=27 POINTS= 0
YOUR PLAY ?
GO
MY CARD IS THE 4 SUM=31 POINTS= 4
```

```
YOUR PLAY ?
4
YOU PLAYED THE 5 SUM= 5 POINTS= 0
MY CARD IS THE Q SUM=15 POINTS= 2
YOUR PLAY ?
6
YOU PLAYED THE 5 SUM=20 POINTS= 0

YOU GET 1 POINT FOR LAST CARD

YOU SCORE FIRST
HOW MANY POINTS ?
8
MY CARDS ARE

J OF DIAMONDS
Q OF DIAMONDS
4 OF CLUBS
4 OF DIAMONDS

2 POINTS

THE CRIB CARDS ARE

8 OF CLUBS
9 OF HEARTS
3 OF DIAMONDS
A OF HEARTS

6 POINTS

I HAVE 14 POINTS - YOU HAVE 9 POINTS
```



# TRS-80 SOLUTIONS BIZ-80

Software products oriented to  
four levels of TRS-80 supported systems —  
**ALL SYSTEMS UPWARD COMPATIBLE**

**SYSTEM-S** \$99.95  
A stand-alone 16K Level II with one cassette tape

**SYSTEM-I** \$249.95  
A 32K Level II with DOS, optional printer  
(CRT oriented) and one disk

**SYSTEM-II** \$499.95  
A 32K Level II with DOS, line printer and two disks

**SYSTEM-III** Write for full particulars  
A 48K Level II with DOS, line printer and two-plus disks

- Inventory •Mailing - names and addresses
- Accounts Receivable •Order Processing •Invoicing
- Accounts Payable •General Ledger •Fixed Assets
- Profit & Loss Statements •Word Processing
- Labor Scheduling •Sales Analysis/Statistics
- Patient Billing •And MORE...

**BIZ-80** A PLAN — not a package  
17 Briar Cliff Dr. Milford, NH  
603-673-5284

## Level 2 Sampler

Adventure D 32K	\$24.95	End Zone 16K*	\$7.95
Pork Barrel 16K	\$9.95	Inventory I D 32K	\$59.95
'Round the Horn 16K	\$9.95	Accts. Rec. D 16K	\$59.95
Star Trek III.3 16K	\$14.95	Payroll I D 32K	\$59.95
X-Wing Fighter 16K	\$7.95	Mail List I D 16K	\$19.95
Ten Pin 16K	\$7.95	Mail List II D 32K	\$99.95
Slalom 16K	\$7.95	Appt. Log 16K	\$9.95
Cribbage 16K*	\$7.95	Ham Radio 16K	\$9.95
Sargon 16K	\$19.95	Renumber D 4-48K	\$25.00
Backgammon 16K	\$7.95	Personal Finance 16K	\$9.95
Inventory II D 32K	\$150.00	Tarot 16K*	\$9.95

\* Also available in Level I  
D = Disk

**TS&E TRS-80**  
**Software Exchange**  
17 BRIAR CLIFF DRIVE MILFORD, NEW HAMPSHIRE 03055  
SEND FOR OUR COMPLETE CATALOG TODAY!

**SoftSide™**  
"your BASIC software magazine"

IF YOU HAVEN'T SUBSCRIBED TO  
SOFTSIDE, YOU MISSED:

**OCTOBER** Cribbage, State Capital Quiz, Death  
Star, Pillbox, Calculator

**NOVEMBER** End Zone, Troll's Gold, Shopping  
List, Level I to Level II, Octal to Hex Conversion

**DECEMBER** Santa Paravia, Mortgage Calculation,  
Six Million Dollar (/10K) Clock, Spelling Bee,  
Biorhythms

**JANUARY** 'Round the Horn, Kiddy Slot, Writing  
Good Computer Games-Part I, Ten Pin Bowling,  
High Speed Graphics, Comput-A-Sketch

**FEBRUARY** Form 1040, Writing Good Computer  
Games-Part II, Concentration, Elements Quiz,  
Cribbage Update

12 issues — \$15.00

HOW MUCH LONGER  
CAN THIS GO ON?

Softside Subscriptions  
Box 68 Milford, NH 03055  
603-673-5144

## SoftSide™ Cassettes

Each month brings you a new issue of SoftSide  
PLUS the prerecorded cassette version of that  
month's feature programs, ready to run. That's  
all included in your six month membership for  
only \$38.00 [Thirty programs for only about  
a dollar apiece]



SEND IN YOUR ORDER TODAY —  
LEAVE THE CODING TO US!



SoftSide Cassettes  
PO Box 68 Milford, NH 03055  
603-673-5144

NEW  
PUBLICATION

**PROG**  
**80**

Dedicated to the serious programmer, from  
enthusiastic hobbyist to professional

### PREMIER EDITION FEATURES

Inkey Routines by Lance Micklus

Simple SiMON-monitor/disassembler  
written in BASIC

Variables in Level II-how to determine  
which variables have been used

Subscriptions: 4 issues, \$10.00  
PO Box 68 Milford, NH 03055



# Cribbage con't...

YOUR PLAY ?

6

YOU PLAYED THE 9 SUM= 9 POINTS= 0

YOU GET 1 POINT FOR LAST CARD

I SCORE FIRST  
MY CARDS ARE

J OF SPADES  
6 OF CLUBS  
5 OF CLUBS  
7 OF CLUBS

8 POINTS

HOW MANY POINTS ?

4

THE CRIB CARDS ARE

9 OF HEARTS  
2 OF DIAMONDS  
2 OF CLUBS  
6 OF HEARTS

HOW MANY POINTS ?

2

MUGGINS FOR 2 POINTS

I HAVE 104 POINTS - YOU HAVE 99 POINTS

I AM DEALING

YOUR CARDS ARE

(1) 5 OF HEARTS  
(2) 3 OF CLUBS  
(3) 5 OF DIAMONDS  
(4) 8 OF HEARTS

(5) Q OF SPADES  
(6) 6 OF CLUBS

YOUR DISCARDS ?

2,4

THE UP CARD IS THE 10 OF DIAMONDS

YOUR PLAY ?

5

YOU PLAYED THE Q SUM=10 POINTS= 0  
MY CARD IS THE Q SUM=20 POINTS= 2

YOUR PLAY ?

6

YOU PLAYED THE 6 SUM=26 POINTS= 0  
MY CARD IS THE 2 SUM=28 POINTS= 0

YOUR PLAY ?

10

MY CARD IS THE 3 SUM=31 POINTS= 2

YOUR PLAY ?

1

YOU PLAYED THE 5 SUM= 5 POINTS= 0  
MY CARD IS THE 10 SUM=15 POINTS= 2

YOUR PLAY ?

3

YOU PLAYED THE 5 SUM=20 POINTS= 0

YOU GET 1 POINT FOR LAST CARD

YOU SCORE FIRST

HOW MANY POINTS ?

10

MY CARDS ARE

Q OF CLUBS  
2 OF SPADES  
3 OF DIAMONDS  
10 OF SPADES

8 POINTS

THE CRIB CARDS ARE

9 OF CLUBS  
9 OF SPADES  
3 OF CLUBS  
8 OF HEARTS

8 POINTS

I WIN 126 TO 110

Later in  
the Run

Program  
Listing

```
00010 DIM D(52,4),C$(52),I(52),W(5,4),M(6,4),Y(6,4),C(4,4)
00020 DIM D$(6),V(15,7),Q(11,6),R(4,5),S(4),J(52)
00030 MAT READ V,Q,R,S,D$
00040 FOR I=1 TO 13
00050 READ C$
00060 STR$(C$,4,12)="OF SPADES "
00070 C$(1)=C$
00080 STR$(C$,4,12)="OF DIAMONDS "
00090 C$(1+13)=C$
00100 STR$(C$,4,12)="OF HEARTS "
00110 C$(1+26)=C$
00120 STR$(C$,4,12)="OF CLUBS "
00130 C$(1+39)=C$
00140 NEXT I
00150 PRINT
00160 PRINT
00170 S1,S2=0
00180 REM - SHUFFLE THE DECK THEN CUT FOR DEAL - LOW
00190 GOSUB 5630 CARD DEALS
00200 GOSUB 5790
00210 REM - SHUFFLE THE DECK AND DEAL
00220 GOSUB 5630
00230 GOSUB 6050
00240 REM - FIND THE BEST FOUR CARDS - DISCARD THE
00250 GOSUB 3350 OTHER TWO
00260 REM - DISCARDS
00270 I1=V(89,5)
00280 I2=V(89,6)
00290 PRINT
00300 PRINT "YOUR DISCARDS "
00310 INPUT I3,I4
00320 IF I3<1 THEN 340
00330 IF I3<7 THEN 360
00340 PRINT "NOW REALLY "
00350 GOTO 300
00360 IF INT(I3)<>I3 THEN 340
00370 IF I4=I3 THEN 340
00380 IF I4<1 THEN 340
00390 IF I4>6 THEN 340
00400 IF I4<>INT(I4) THEN 340
00410 REM - CRIB
00420 FOR J=1 TO 4
00430 C(1,J)=M(I1,J)
00440 C(2,J)=M(I2,J)
00450 C(3,J)=Y(I3,J)
00460 C(4,J)=Y(I4,J)
00470 NEXT J
00480 REM - GENERATE THE UPCARD
00490 GOSUB 4150
00500 REM - PLAY OF THE HAND
00510 GOSUB 1410
00520 IF M=0 THEN 560
00530 PRINT "YOU SCORE FIRST "
00540 X1=1
00550 GOTO 800
00560 PRINT "I SCORE FIRST"
00570 X1=2
00580 GOTO 1070
00590 PRINT "THE CRIB CARDS ARE"
00600 PRINT
00610 FOR I=1 TO 4
00620 PRINT C$(C(I,1))
00630 NEXT I
00640 FOR I=1 TO 4
00650 FOR J=1 TO 4
00660 W(I,J)=C(I,J)
00670 NEXT J
00680 NEXT I
00690 C=1
00700 W(5,4)=I9
00710 GOSUB 4360
00720 GOTO 730,780 ON X1
00730 PRINT
00740 PRINT P;" POINTS"
00750 S1=S1+P
00760 IF S1>=121 THEN 1320
00770 GOTO 1280
00780 X1=3
00790 GOTO 920
00800 K=1
00810 FOR I=1 TO 6
00820 IF I=13 THEN 880
00830 IF I=14 THEN 880
00840 FOR J=1 TO 4
00850 W(K,J)=Y(I,J)
00860 NEXT J
00870 K=K+1
00880 NEXT I
00890 W(5,4)=I9
00900 C=0
00910 GOSUB 4360
00920 PRINT "HOW MANY POINTS ";
```



# ADVANCED COMPUTER PRODUCTS

-NOW IN STOCK!

## ... and it's COLOR "The Compucolor II"

... a personal colorgraphics system for the modern computer man ...

- ★ Color Graphics 13" Color CRT
- ★ Proven 8080A CPU System
- ★ 16K Extended Disk Basic
- ★ Up to 117\* Key Keyboard
- ★ Up to 32K\* RAM
- ★ Minidisk Drive 51.2K Bytes/Side



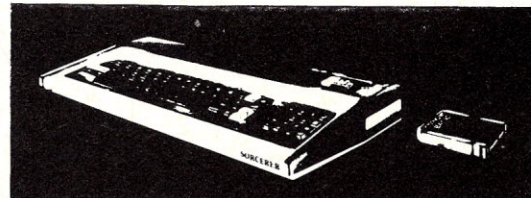
\*option

Model 3 w/8K, 72 Key Keyboard, RS232 ..... \$1495.00  
 Model 4 w/16K, 72 Key Keyboard, RS232 ..... \$1695.00  
 Model 5 w/32K, 72 Key Keyboard, RS232 ..... \$1995.00  
 Options: 101 Key Keyboard ..... Add \$135.00  
 117 Key Keyboard ..... Add \$200.00  
 Formatted Diskettes ..... 2/\$19.95  
 Programmed Diskettes ..... \$19.95  
 Diskette Library Inc. Hangman, Othello, Math, Chess, Startrek, Blackjack, Cubic Tic Tac Toe, Finance Vol. I, Finance Vol. II, Bonds and Securities, Assembler, Text Editor, Personal Data Base.  
 Send for Complete Software Listing

# COMPUTER SPECIALS

## EXIDY SORCERER™

SPECIAL OFFER!  
FREE SANYO 9" Monitor or equiv. with purchase of 32K.



**\$895 w/8K**  
**\$1150 w/16K**  
**\$1395 w/32K**

User programmable or use cartridges. Combines the desirable features of the PET, APPLE and TRS-80 into a complete expandable computer system. If you are a comparison shopper send for comparison chart.

- ★ INCLUDES:  
Keyboard & enclosure totally assembled  
90 day Warranty  
MICROSOFT BASIC  
Video & Cassette Cable  
Complete Documentation
- ★★ \$100 Expansion Module ..... Add \$299.00
- ★★ Cassette recorder ..... Add \$44.95
- ★★ Sanyo 9" Monitor ..... Add \$169.95

## KIM-1

Now only  
**\$179.00**

- ★★ Power Supply ..... Add \$59.95
- ★★ Cassette Recorder ..... Add \$44.95
- ★★ Sanyo 9" Monitor ..... Add \$169.95
- Add enclosure \$29.95.



## SYM-1 IN STOCK

Reg. \$269.00

Now  
**\$249.00**

- ★ KIM-1 Compatible
- ★ 4K ROM Monitor
- ★ 1K Bytes 2114 RAM
- ★ 65K Memory Expansion
- ★ User EPROM 2716
- ★★ Power Supply ..... Add \$59.95
- ★★ Cassette Recorder ..... Add \$44.95
- ★★ Sanyo 9" Monitor ..... Add \$169.95

School & group discounts available.  
 Buy now and receive \$100.00 worth of discount coupons: i.e.,  
 ★ SRM-1 1K Static RAM exp. reg. 42.00 ..... disc. \$32.00  
 ★ PEX-1 I/O Port, reg. \$60.00 ..... disc. \$50.00  
 ★ SYM BAS-1 Basic ROM (Microsoft) reg. \$159.00 ..... disc. \$109.00  
 ★ KTM-2 CRT/TV Keyboard, reg. \$349.00 ..... disc. \$319.00  
 SYM Enclosure ..... \$39.95



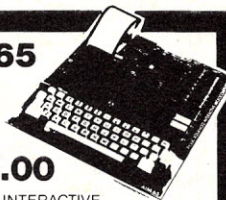
## AIM 65

**\$375.00**

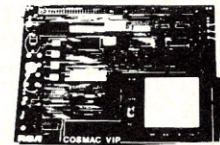
ADVANCED INTERACTIVE MICROCOMPUTER

- ★ On Board 20 column alphanumeric printer
- ★ Alphanumeric 20 character display
- ★ Terminal style Keyboard 54 Keys
- ★ 6502 based CPU

w/1K RAM ..... \$375.00\*  
 w/4K RAM ..... \$450.00\*  
 Assembler ROM ..... Add \$85.00  
 BASIC IN ROM ..... Add \$100.00  
 Power Supply ..... Add \$99.95  
 Enclosure ..... Add \$59.95  
 \*10.00 Shipping & Handling



## RCA COSMAC VIP



NEW LOW PRICE **\$249.00**

Assembled. Regular price \$299.95  
 w/Sanyo 9" Monitor ..... Add \$169.95

VP-590 Color Board ..... 69.95  
 VP-595 Sound Board ..... 49.95  
 VP-570 4K Expansion Board ..... 95.95  
 VP-580 Expansion Keyboard ..... 15.95  
 VP-700 Tiny Basic ROM ..... 49.95  
 VP-710 VIP Game Manual ..... 10.95

## COMMODORE "PET"

Delivery from stock  
 Advanced 8K Model  
**only \$775.00**



## ANADIX PRINTER BREAKTHRU!

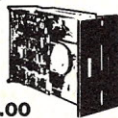
- ★ 80 Columns, 112 cps
- ★ 84 lpm Bidirectional
- ★ Sprocket Feed
- ★ 9 x 7 Dot Matrix, Impact
- ★ Parallel or Serial

List \$995.00  
**ACP \$895.00**  
 Introductory Price



## FLOPPY DISK DRIVE SPECIAL

Siemens/GSI FDD 100-8  
 Single Sided 8" Floppy  
 IBM 3740 Compatible  
 IBM System 32  
 Shugart (Elec.)  
 Compatible  
 reg. \$495.00  
**NOW ONLY \$375.00**  
 Manual Add \$20.00



## NORTH STAR HORIZON ★DOUBLE DENSITY★

Now in stock North Star Z-80 based high-performance computer.

- ★ 180K Bytes per Disk
- ★ Z-80 Processor
- ★ Motherboard
- ★ 2 Serial + 1 Parallel Port Avail.
- ★ 16K RAM

Horizon I Kit ..... \$1349.00 (reg. \$1599) Assem. \$1649.00  
 Horizon II Kit ..... \$1799.00 (reg. \$1999) Assem. \$2199.00  
 Additional Disk Drive Kit ..... \$349.00 Additional 16K Memory ..... \$379.00  
 North Star Double Density Disk Subsystem Kit ..... \$599.00



## PRINTERS

OKIDATA Model 110 w/tractor w/RS232 ..... \$1675.00  
 OKIDATA Model 22 w/tractor w/RS232 ..... \$2705.00  
 DECOWRITER II w/RS232 10-30 cps ..... \$1675.00  
 DIABLO 1620-3 w/tractor feed, w/Keyboard ..... \$3255.00  
 DIABLO 1610-3 w/tractor feed ..... \$2995.00  
 IPSI 1622-3 w/tractor feed (diablo compatible) ..... \$2995.00  
 IPSI 1612-3 w/tractor feed (diablo compatible) ..... \$2820.00  
 Centronics 761 (KSR) ..... \$1595.00  
 Centronics Micro S-1 ..... \$525.00

Centronics Micro P-1 ..... **SALE** \$395.00  
 Centronics 761RO ..... \$1495.00  
 Centronics 779 w/tractor feed ..... \$1195.00  
 Teletype Model 43 w/RS232 ..... \$1199.00  
 TI Model 745 w/upper & lower cs. \$1975.00  
 TI Model 810 ..... \$1895.00  
 Trencom 40 col. Thermal Printer w/APPLE I/O ..... **SALE** \$405.00

## FLOPPY DISK'S

Shugart SA400 Minifloppy Disk ..... \$295.00  
 Shugart SA450 Dual Density ..... \$375.00  
 MPI B51 Double Density ..... \$279.00  
 MPI B52 Dual Head ..... \$395.00  
 Shugart SA800/801 Disk Drive ..... \$495.00  
 Shugart SA850/851 Dbl-Sided ..... \$625.00  
 Persci Model 277 Dual ..... **SALES** \$1195.00

Calcomp Model 143M Dual Density Drive ..... \$625.00  
 Vista V-200 Minifloppy System w/S-100 w/CPM Double Density Controller Assembled ..... \$699.00  
 Vista V-80 Minidisk for TRS 80 ..... \$395.00  
 Vista V-250 Dual Shugart Floppy System w/S-100 Controller w/CPM Assembled ..... \$2199.00

Siemens/GSI FD 100-8 Shugart (Elec.) 801 Compatible ..... \$375.00

## TERMINALS

SOROC IQ 120 ..... \$895.00  
 LEAR ADM3A Assembled **SALE** \$799.00

SOROC IQ 140 ..... \$1395.00  
 Sanyo 9" Monitor ..... \$169.95  
 Sanyo 15" Monitor ..... \$209.95  
 Motorola 12" Monitor w/o chassis ..... \$219.95  
 Hazeltine 1400 ..... \$750.00  
 Hazeltine 1500 ..... \$1095.00  
 Hazeltine 1510 ..... \$1295.00

## KEYBOARDS

GEO Risk Model 756 ASCII 56 Key Assembled ..... \$69.95  
 Metal case for Model 756 ..... \$27.00  
 Clare Pender 62 Key ASCII w/26 Pin and 34 Pin Connector (new surplus supply limited) ..... **SALE** \$54.95  
 63 Key Unencoded Keyboard ..... \$32.95  
 10 Key Hexpad Unencoded ..... \$11.95

## ADVANCED COMPUTER PRODUCTS

P. O. Box 17329 • Irvine, California 92713  
 1310 B E. Edinger • Santa Ana, California 92705  
 TWX/TELEX 910 595 1565 • TEL (714) 558-8813

All prices FOB Santa Ana. Please add shipping/handling.  
 For credit card purchase contact for quotation. Complete  
 FREE 1978 Catalogue - send 25¢ for postage. Pricing  
 subject to change without notice.



# Cribbage con't...

```

00930 INPUT P9
00940 D=P-P9
00950 IF D>=0 THEN 980
00960 PRINT "NOT WITH THAT HAND - TRY AGAIN"
00970 GOTO 930
00980 S2=S2+P9
00990 IF S2>=121 THEN 1360
01000 IF D=0 THEN 1060
01010 S1=S1+D
01020 PRINT
01030 PRINT "MUGGINS FOR ";D;" POINTS"
01040 PRINT
01050 IF S1>=121 THEN 1320
01060 GOTO 1070,590,1280 ON X1
01070 FOR K=1 TO 4
01080 L=V(B9,K)
01090 FOR J=1 TO 4
01100 W(K,J)=M(L,J)
01110 NEXT J
01120 NEXT K
01130 PRINT "MY CARDS ARE"
01140 PRINT
01150 FOR K=1 TO 4
01160 L=W(K,1)
01170 PRINT C$(L)
01180 NEXT K
01190 W(5,4)=T9
01200 C=0
01210 GOSUB 4360
01220 S1=S1+P
01230 IF S1>=121 THEN 1320
01240 PRINT
01250 PRINT P;" POINTS"
01260 PRINT
01270 GOTO 590,800 ON X1
01280 PRINT
01290 PRINT "I HAVE ";S1;" POINTS - YOU HAVE ";S2;" POINTS"
01300 PRINT
01310 GOTO 210
01320 PRINT
01330 PRINT "I WIN ";S1;" TO ";S2
01340 PRINT
01350 STOP
01360 PRINT
01370 PRINT "YOU WIN ";S2;" TO ";S1
01380 PRINT
01390 STOP
01400 REM *****
01410 REM ** PLAY OF THE HAND **
01420 REM *****
01430 Y5,M5,C,S9,G=0
01440 IF M=0 THEN 1830
01450 IF Y5<>4 THEN 1480
01460 IF M5=4 THEN 2460
01470 GOTO 1830
01480 PRINT "YOUR PLAY ";
01490 INPUT C$
01500 IF C$='GO' THEN 1830
01510 FOR C6=1 TO 6
01520 IF C$=D$(C6) THEN 1560
01530 NEXT C6
01540 PRINT "INVALID PLAY "
01550 GOTO 1490
01560 IF C6=13 THEN 1770
01570 IF C6=14 THEN 1770
01580 IF Y5=0 THEN 1620
01590 FOR J=1 TO Y5
01600 IF I(10+J)=C6 THEN 1790
01610 NEXT J
01620 IF S9+Y(C6,2)>31 THEN 1810
01630 S9=S9+Y(C6,2)
01640 Y5=Y5+1
01650 I(10+Y5)=C6
01660 C=C+1
01670 J(C)=Y(C6,4)
01680 GOSUB 2900
01690 PRINT USING 1700,C$(Y(C6,1)),S9,P
01700 : YOU PLAYED THE ## SUM=## POINTS=##
01710 F=1
01720 S2=S2+P
01730 IF S2>=121 THEN 1360
01740 IF S9<>31 THEN 1830
01750 F,C,S9,G=0
01760 GOTO 1830
01770 PRINT "YOU DISCARDED THAT CARD - TRY AGAIN"
01780 GOTO 1490
01790 PRINT "ALREADY PLAYED - TRY AGAIN"
01800 GOTO 1490
01810 PRINT "THAT TOTALS MORE THAN 31 - TRY AGAIN"
01820 GOTO 1490
01830 IF M5<>4 THEN 2000
01840 IF Y5=4 THEN 2460
01850 IF C$<>'GO' THEN 1450
01860 PRINT
01870 IF F=2 THEN 1940
01880 PRINT "YOU GET 1 POINT FOR LAST CARD"
01890 PRINT
01900 S2=S2+1
01910 IF S2>=121 THEN 1360
01920 F,C,S9=0
01930 GOTO 1450
01940 PRINT "I GET 1 POINT FOR LAST CARD"
01950 PRINT
01960 S1=S1+1
01970 IF S1>=121 THEN 1320
01980 F,C,S9=0
01990 GOTO 1450
02000 K9,P9=0
02010 C9=C
02020 C=C+1
02030 H9=S9
02040 FOR I9=1 TO 6
02050 I(I9)=0
02060 IF I9=11 THEN 2200
02070 IF I9=12 THEN 2200
02080 IF M5=0 THEN 2120
02090 FOR J9=1 TO M5
02100 IF I9=I(20+J9) THEN 2200
02110 NEXT J9
02120 IF H9+M(I9,2)>31 THEN 2200
02130 K9=K9+1
02140 S9=H9+M(I9,2)
02150 J(C)=M(I9,4)
02160 GOSUB 2900
02170 P9=MAX(P9,P)
02180 I(I9)=P
02190 I(K9+30)=I9
02200 NEXT I9
02210 C=C9
02220 S9=H9
02230 IF K9<>0 THEN 2580
02240 IF C$<>'GO' THEN 2330
02250 IF G=1 THEN 2340
02260 PRINT
02270 PRINT "I GET 1 POINT FOR LAST CARD"
02280 PRINT
02290 C,S9=0
02300 S1=S1+1
02310 IF S1>=121 THEN 1320
02320 GOTO 1450
02330 IF Y5<>4 THEN 2420
02340 PRINT
02350 PRINT " I'LL GIVE YOU 1 POINT FOR LAST CARD"
02360 PRINT
02370 S2=S2+1
02380 IF S2>=121 THEN 1360
02390 C,S9,G=0
02400 C$=""
02410 GOTO 1830
02420 IF G=1 THEN 1450
02430 PRINT "GO"
02440 G=1
02450 GOTO 1450
02460 IF F=0 THEN 2560
02470 PRINT
02480 IF F=1 THEN 2530
02490 PRINT "I GET 1 POINT FOR LAST CARD"
02500 S1=S1+1
02510 IF S1>=121 THEN 1320
02520 GOTO 2560
02530 PRINT "YOU GET 1 POINT FOR LAST CARD"
02540 S2=S2+1
02550 IF S2>=121 THEN 1360
02560 PRINT
02570 RETURN
02580 C=C+1
02590 M5=M5+1
02600 IF C<>1 THEN 2730
02610 FOR J9=1 TO 4
02620 I9=V(B9,J9)
02630 REM - DON'T PLAY A 5 FIRST
02640 IF M(I9,2)=5 THEN 2700
02650 I(M5+20)=I9
02660 J(C)=M(I9,4)
02670 P9=0
02680 S9=M(I9,2)
02690 GOTO 2800
02700 NEXT J9
02710 L=V(B9,1)
02720 GOTO 2650
02730 FOR J9=1 TO K9
02740 I9=I(J9+30)
02750 IF I(I9)=P9 THEN 2770
02760 NEXT J9

```



# How to be 16 places at once, logically.



When's the last time you had a nice chat with an integrated circuit? All you need is something to translate what's happening in its simple little logical mind. Something like our popular Logic Monitors.

Clip one onto an IC — any DIP up to 16 pins — and the 16 LEDs atop our Logic Monitor flash to the rhythm of the state of each pin. You have, in effect, 16 tiny logic probes in one pocket-size circuit-powered

instrument.

And, as everyone knows, 16 LEDs are better than one. Because with just a glance, you can see inputs affecting outputs, a whole IC at a time.

You can watch counters count, decoders decode, logic think its way through. And the more you watch it, the more it tells you. You'll call it smart, a timesaver. We just think it's logical.

70 Fulton Terr., New Haven, CT 06509 (203) 624-3103, TWX 710-465-1227  
OTHER OFFICES: San Francisco: (415) 421-8872, TWX 910-372-7992  
Europe: CSC UK LTD. Phone Saffron-Walden 0799-21682, TLX 817477  
Canada: Len Finkler Ltd., Ontario

CONTINENTAL SPECIALTIES CORPORATION



Call toll-free for details  
**1-800-243-6077**

\* Suggested U.S. resale. Available at selected local distributors. Prices, specifications subject to change without notice. © Copyright 1979 Continental Specialties Corporation

CIRCLE 111 ON READER SERVICE CARD



# Cribbage con't...

```

02770 I(M5+20)=19
02780 J(C)=M(I9,4)
02790 S9=S9+M(I9,2)
02800 PRINT USING 2810,C$(M(I9,1)),S9,P9
02810 : MY CARD IS THE ## SUM=## POINTS=##
02820 F=2
02830 S1=S1+P9
02840 IF S1>=121 THEN 1320
02850 IF S9<>31 THEN 2880
02860 F,C,S9=0
02870 GOTO 1450
02880 IF C$='6U' THEN 1830
02890 GOTO 1450
02900 REM *****
02910 REM ** CHECK FOR 15 OR 31 OR **
02920 REM ** 2,3,4 OF A KIND AND RUNS **
02930 REM *****
02940 P=0
02950 IF C=1 THEN 3170
02960 IF S9<>15 THEN 2990
02970 P=P+2
02980 GOTO 3010
02990 IF S9<>31 THEN 3010
03000 P=P+2
03010 FOR I=C TO MAX(C-2,2) STEP -1
03020 IF J(I)<>J(I-1) THEN 3100
03030 GOTO 3040,3060,3080 ON C-I+1
03040 P=P+2
03050 GOTO 3090
03060 P=P+4
03070 GOTO 3090
03080 P=P+6
03090 NEXT I
03100 REM - RUNS
03110 IF C=2 THEN 3170
03120 R9=0
03130 FOR I=3 TO C
03140 GOSUB 3180
03150 NEXT I
03160 P=P+R9
03170 RETURN
03180 FOR J=1 TO C
03190 J(J+10)=J(C-J+1)
03200 NEXT J
03210 FOR K=1 TO I
03220 FOR L=K+1 TO I
03230 IF J(K+10)<J(L+10) THEN 3270
03240 X=J(K+10)
03250 J(K+10)=J(L+10)
03260 J(L+10)=X
03270 NEXT L
03280 NEXT K
03290 FOR K=1 TO I-1
03300 IF J(K+10)<>J(K+11)-1 THEN 3330
03310 NEXT K
03320 R9=1
03330 RETURN
03340 REM *****
03350 REM ** FIND THE BEST FOUR CARD HAND **
03360 REM *****
03370 P9=0
03380 FOR Z9=1 TO 15
03390 I1=V(Z9,1)
03400 I2=V(Z9,2)
03410 I3=V(Z9,3)
03420 I4=V(Z9,4)
03430 FOR J=1 TO 4
03440 W(1,J)=M(I1,J)
03450 W(2,J)=M(I2,J)
03460 W(3,J)=M(I3,J)
03470 W(4,J)=M(I4,J)
03480 W(5,J)=25
03490 NEXT J
03500 REM - EVALUATE THE HAND
03510 C=0
03520 GOSUB 4360
03530 V(Z9,7)=P
03540 P9=MAX(P9,P)
03550 NEXT Z9
03560 REM - FIND ALL HANDS WITH MAX SCORE (P9)
03570 J=0
03580 FOR I=1 TO 15
03590 IF V(I,7)<>P9 THEN 3620
03600 J=J+1
03610 I(J)=I
03620 NEXT I
03630 IF J>1 THEN 3670
03640 REM - THIS IS THE SINGLE BEST HAND
03650 B9=I(1)
03660 RETURN
03670 REM - NO SINGLE BEST HAND SEARCH FOR KEY CARDS

```

```

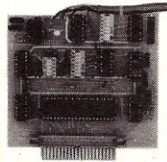
03680 REM - CHECK FOR FIVES
03690 C9=5
03700 Z=1
03710 GOTO 3920
03720 REM - CHECK FOR EIGHTS
03730 C9=8
03740 Z=2
03750 GOTO 3920
03760 REM - CHECK FOR SEVENS
03770 C9=7
03780 Z=3
03790 GOTO 3920
03800 REM - CHECK FOR JACKS
03810 C9=11
03820 Z=4
03830 GOTO 3920
03840 REM - CHECK FOR ACES
03850 C9=1
03860 Z=5
03870 GOTO 3920
03880 REM - RANDOMLY CHOSE A BEST HAND IF WE REACH
THIS POINT
03890 B9=INT(J*RND)+1
03900 B9=1(B9)
03910 RETURN
03920 REM - BEST HAND WILL BE WHICHEVER HAS MOST OF
CARD "C9"
03930 P9=0
03940 FOR I=1 TO 15
03950 J(I)=0
03960 NEXT I
03970 FOR I=1 TO J
03980 FOR K=1 TO 4
03990 L=V(I(I),K)
04000 IF M(L,4)<>C9 THEN 4020
04010 J(I)=J(I)+1
04020 NEXT K
04030 P9=MAX(P9,J(I))
04040 NEXT I
04050 K=0
04060 FOR I=1 TO J
04070 IF J(I)<>P9 THEN 4100
04080 K=K+1
04090 B9=I(I)
04100 NEXT I
04110 IF K<>1 THEN 4130
04120 RETURN
04130 GOTO 3720,3760,3800,3840,3880 ON Z
04140 REM *****
04150 REM ** GENERATE THE UP CARD **
04160 REM *****
04170 U=INT(38*RND)+14
04180 PRINT
04190 PRINT "THE UP CARD IS THE ";C$(D(U,1))
04200 PRINT
04210 FOR I=1 TO 4
04220 W(5,I)=D(U,I)
04230 NEXT I
04240 T9=W(5,4)
04250 IF W(5,4)<>11 THEN 4340
04260 IF M=0 THEN 4310
04270 PRINT "2 POINTS TO ME "
04280 S1=S1+2
04290 IF S1>=121 THEN 1320
04300 RETURN
04310 PRINT "2 POINTS TO YOU "
04320 S2=S2+2
04330 IF S2>=121 THEN 1360
04340 RETURN
04350 REM *****
04360 REM ** SCORE THE FIVE CARD HAND **
04370 REM *****
04380 REM - CHECK FOR A JACK OF SAME SUIT AS UP CARD
(EXCEPT CRIB)
04390 P=0
04400 IF C=1 THEN 4470
04410 FOR I=1 TO 4
04420 IF W(I,4)<>11 THEN 4460
04430 IF W(I,3)<>W(5,3) THEN 4460
04440 P=P+1
04450 GOTO 4470
04460 NEXT I
04470 REM - CHECK FOR A 4 OR 5 CARD FLUSH
04480 FOR I=1 TO 3
04490 IF W(I,3)<>W(I+1,3) GOTO 4590
04500 NEXT I
04510 REM - CRIB SCORES ONLY FOR A 5 CARD FLUSH
04520 IF C<>0 THEN 4570
04530 P=P+4
04540 IF W(4,3)<>W(5,3) THEN 4590
04550 P=P+1
04560 GOTO 4590
04570 IF W(4,3)<>W(5,3) THEN 4590
04580 P=P+5
04590 REM - CHECK FOR 2 CARD SUMS OF 15

```

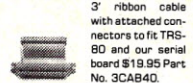


## TRS-80 E.S. SERIAL I/O

- Can input into basic
- Can use LLIST and LPRINT to output, or output continuously
- RS-232 compatible
- Can be used with or without the expansion bus
- On board switch selectable baud rates of 110, 150, 300, 600, 1200, 2400, parity or no parity odd or even, 5 to 8 data bits, and 1 or 2 stop bits. D.T.R. line
- Requires +5, -12 VDC
- Board only \$19.95 Part No. 8010, with parts \$59.95 Part No. 8010A, assembled \$79.95 Part No. 8010 C. No connectors provided, see below.



EIA/RS-232 connector Part No. DB25P \$8.00, with 9', 8 conductor cable \$10.95 Part No. DB25PA.



3' ribbon cable with attached connectors to fit TRS-80 and our serial board \$19.95 Part No. 3CA84Q.

## MODEM\*

- Type 103
- Full or half duplex
- Works up to 300 baud
- Originate or Answer
- No coils, only low cost components
- TTL input and output-serial
- Connect 8  $\Omega$  speaker and crystal mic. directly to board
- Uses XR FSK demodulator
- Requires +5 volts
- Board only \$7.60 Part No. 109, with parts \$27.50 Part No. 109A



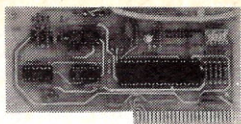
## VERBATIM MINIDISK



Box of 10

\$29.95

## APPLE II\* SERIAL I/O INTERFACE



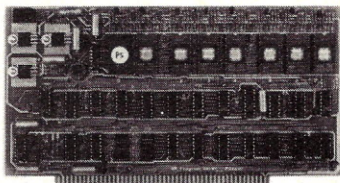
Baud rate is continuously adjustable from 0 to 30,000

- Plugs into any peripheral connector
- Low current drain. RS-232 input and output
- On board switch selectable 5 to 8 data bits, 1 or 2 stop bits, and parity or no parity either odd or even
- Jumper selectable address
- SOFTWARE
- Input and Output routine from monitor or BASIC to teletype or other serial printer
- Program for using an Apple II for a video or an intelligent terminal. Also can output in correspondence code to interface with some selectrics.
- Also watches DTR
- Board only \$15.00 Part No. 2, with parts \$42.00 Part No. 2A, assembled \$62.00 Part No. 2C

## 8K EPROM PIIECON

Saves programs on PROM permanently (until erased via UV light) up to 8K bytes. Programs may be directly run from the program saver such as fixed routines or assemblers.

- S-100 bus compatible
- Room for 8K bytes of EPROM non-volatile memory (2708's).
- On-board PROM programming
- Address relocation of each 4K of memory to any 4K boundary within 64K
- Power on jump and reset jump option for "turnkey" systems and computers without a front panel
- Program saver software available
- Solder mask both sides
- Full silkscreen for easy assembly. Program saver software in 1 2708 EPROM \$25, Bare board \$35 including custom coil, board with parts but no EPROMS \$139, with 4 EPROMS \$179, with 8 EPROMS \$219.



## WAMECO INC. WMC inc.

**FDC-1** FLOPPY CONTROLLER BOARD will drive shugart, pertek, remic 5" & 8" drives up to 8 drives, on board PROM with power boot up, will operate with CPM (not included). PCBD \$42.95

**FPB-1** Front Panel. (Finally) AMSAI size hex displays. Byte or instruction single step. PCBD \$42.95

**MEM-1A** 8Kx8 fully buffered, S-100, uses 2102 type RAMS. \$24.95, \$168 Kit

**PCBD** \$24.95, \$168 Kit

**QMB-12** MOTHER BOARD, 13 slot, terminated, S-100 board only \$34.95 \$89.95 Kit

**CPU-1** 8080A Processor board S-100 with 8 level vector interrupt PCBD \$25.95 \$89.95 Kit

**RTC-1** Realtime clock board. Two independent interrupts. Software programmable. PCBD \$25.95, \$60.95 Kit

**EPM-1** 1702A 4K EPROM card PCBD \$25.95

\$49.95 with parts less EPROMS

**EPM-2** 2708/2716 16K/32K EPROM card PCBD \$24.95

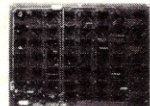
\$49.95 with parts less EPROMS

**QMB-9** MOTHER BOARD. Short Version of QMB-12. 9 Slots PCBD \$30.95 \$67.95 Kit

**MEM-2** 16Kx8 Fully Buffered 2114 Board PCBD \$25.95, \$269.95 Kit

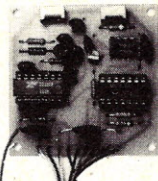
## T.V. TYPEWRITER

- Stand alone TVT
- 32 char/line, 16 lines, modifications for 64 char/line included
- Parallel ASCII (TTL) input
- Video output
- 1K on board memory
- Output for computer controlled cursor
- Auto scroll
- Non-destructive cursor
- Cursor inputs: up, down, left, right, home, EOL, EOS
- Scroll up, down
- Requires +5 volts at 1.5 amps, and -12 volts at 30 mA
- All 7400, TTL chips
- Char. gen. 2513
- Upper case only
- Board only \$39.00 Part No. 106, with parts \$145.00 Part No. 106A



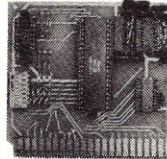
## TAPE \* INTERFACE

- Play and record Kansas City Standard tapes
- Converts a low cost tape recorder to a digital recorder
- Works up to 1200 baud
- Digital in and out are TTL serial
- Output of board connects to mic. in of recorder
- Earphone of recorder connects to input on board
- No coils
- Requires +5 volts, low power drain
- Board only \$7.60 Part No. 111, with parts \$27.50 Part No. 111A



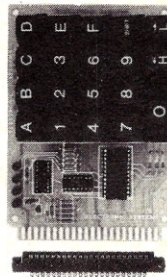
## UART & BAUD RATE GENERATOR\*

- Converts serial to parallel and parallel to serial
- Low cost on board baud rate generator
- Baud rates: 110, 150, 300, 600, 1200, and 2400
- Low power drain +5 volts and -12 volts required
- TTL compatible
- All characters contain a start bit, 5 to 8 data bits, 1 or 2 stop bits, and either odd or even parity.
- All connections go to a 44 pin gold plated edge connector
- Board only \$12.00 Part No. 101, with parts \$35.00 Part No. 101A, 44 pin edge connector \$4.00 Part No. 44P



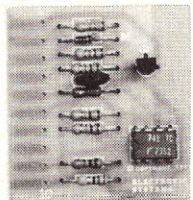
## HEX ENCODED KEYBOARD E.S.

This HEX keyboard has 19 keys, 16 encoded with 3 user definable. The encoded TTL outputs, 8-4-2-1 and STROBE are debounced and available in true and complement form. Four onboard LEDs indicate the HEX code generated for each key depression. The board requires a single +5 volt supply. Board only \$15.00 Part No. HEX-3, with parts \$49.95 Part No. HEX-3A. 44 pin edge connector \$4.00 Part No. 44P.



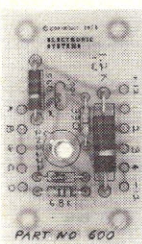
## RS-232/ TTL\* INTERFACE

- Converts TTL to RS-232, and converts RS-232 to TTL
- Two separate circuits
- Requires -12 and +12 volts
- All connections go to a 10 pin gold plated edge connector
- Board only \$4.50 Part No. 232, with parts \$7.00 Part No. 232A 10 Pin edge connector \$3.00 Part No. 10P



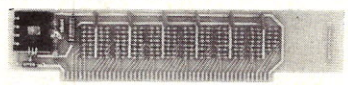
## RS-232/ TTY\* INTERFACE

- Converts RS-232 to 20mA current loop, and 20mA current loop to RS-232
- Two separate circuits
- Requires +12 and -12 volts
- Board only \$4.50 Part No. 600, with parts \$7.00 Part No. 600A



## S-100 BUS \* ACTIVE TERMINATOR

Board only \$14.95 Part No. 900, with parts \$24.95 Part No. 900A



## DC POWER SUPPLY\*

- Board supplies a regulated +5 volts at 3 amps., +12, -12, and -5 volts at 1 amp.
- Power required is 8 volts AC at 3 amps., and 24 volts AC C.T. at 1.5 amps.
- Board only \$12.50 Part No. 6085, with parts excluding transformers \$42.50 Part No. 6085A



## To Order:

Mention part number, description, and price. In USA, shipping paid for orders accompanied by check, money order, or Master Charge, BankAmericard, or VISA number, expiration date and signature. Shipping charges added to C.O.D. orders. California residents add 6.5% for tax. Outside USA add 10% for air mail postage and handling, no C.O.D.'s. Checks and money orders must be payable in US dollars. Parts kits include sockets for all ICs, components, and circuit board. Documentation is included with all products. Prices are in US dollars. No open accounts. To eliminate tariff in Canada boxes are marked "Computer Parts." Dealer inquiries invited. 24 Hour Order Line: (408) 226-4064



For free catalog including parts lists and schematics, send a self-addressed stamped envelope.

# ELECTRONIC SYSTEMS

Dept. X, P. O. Box 21638, San Jose, CA USA 95151



# Cribbage con't...

```

04600 FOR I=1 TO 4
04610 FOR J=I+1 TO 5
04620 IF W(I,2)+W(J,2)<>15 THEN 4640
04630 P=P+2
04640 NEXT J
04650 NEXT I
04660 REM - CHECK FOR 3 CARD SUMS OF 15
04670 FOR I=1 TO 3
04680 FOR J=I+1 TO 4
04690 FOR K=J+1 TO 5
04700 IF W(I,2)+W(J,2)+W(K,2)<>15 THEN 4720
04710 P=P+2
04720 NEXT K
04730 NEXT J
04740 NEXT I
04750 REM - CHECK FOR 4 CARD SUMS OF 15
04760 FOR I=1 TO 2
04770 FOR J=I+1 TO 3
04780 FOR K=J+1 TO 4
04790 FOR L=K+1 TO 5
04800 IF W(I,2)+W(J,2)+W(K,2)+W(L,2)<>15 THEN 4820
04810 P=P+2
04820 NEXT L
04830 NEXT K
04840 NEXT J
04850 NEXT I
04860 REM - CHECK FOR 5 CARD SUM OF 15
04870 S=0
04880 FOR I=1 TO 5
04890 S=S+W(I,2)
04900 NEXT I
04910 IF S<>15 THEN 4930
04920 P=P+2
04930 REM - CHECK FOR PAIRS, THREE AND FOUR OF A KIND
04940 FOR I=1 TO 13
04950 J(I)=0
04960 NEXT I
04970 FOR I=1 TO 5
04980 J=W(I,4)
04990 J(J)=J(J)+1
05000 NEXT I
05010 FOR I=1 TO 13
05020 GOTO 5060,5060,5050,5040,5030 ON J(I)+1
05030 P=P+6
05040 P=P+4
05050 P=P+2
05060 NEXT I
05070 REM - SORT HAND INTO ASCENDING SEQUENCE
05080 FOR I=1 TO 5
05090 FOR J=I TO 5
05100 IF W(I,4)<W(J,4) THEN 5140
05110 K=W(I,4)
05120 W(I,4)=W(J,4)
05130 W(J,4)=K
05140 NEXT J
05150 NEXT I
05160 REM - CHECK FOR A 5 CARD RUN
05170 D=W(1,4)-W(1,1)
05180 FOR I=1 TO 11
05190 FOR J=1 TO 5
05200 Q(I,J)=Q(I,J)+D
05210 NEXT J
05220 NEXT I
05230 FOR I=1 TO 11
05240 FOR J=1 TO 5
05250 IF W(J,4)<>Q(I,J) THEN 5300
05260 NEXT J
05270 REM - A 5 CARD RUN
05280 P=P+Q(I,6)
05290 RETURN
05300 NEXT I
05310 REM - CHECK FOR A 4 CARD RUN
05320 FOR L=1 TO 2
05330 D=W(L,4)-R(1,1)
05340 FOR I=1 TO 4
05350 FOR J=1 TO 4
05360 R(I,J)=R(I,J)+D
05370 NEXT J
05380 NEXT I
05390 FOR I=1 TO 4
05400 FOR K=1 TO 4
05410 IF W(K+L-1,4)<>R(I,K) THEN 5460
05420 NEXT K
05430 REM - A 4 CARD RUN
05440 P=P+R(I,5)
05450 RETURN
05460 NEXT I
05470 NEXT L
05480 REM - CHECK FOR A 3 CARD RUN
05490 FOR L=1 TO 3
05500 D=W(L,4)-S(1)
05510 FOR I=1 TO 3

```

```

05520 S(I)=S(I)+D
05530 NEXT I
05540 FOR I=1 TO 3
05550 IF W(L+I-1,4)<>S(I) THEN 5600
05560 NEXT I
05570 REM - A 3 CARD RUN
05580 P=P+S(4)
05590 RETURN
05600 NEXT L
05610 RETURN
05620 REM *****
05630 REM ** SHUFFLE THE DECK **
05640 REM *****
05650 FOR I= 1 TO 52
05660 I(I)=0
05670 NEXT I
05680 FOR I=1 TO 52
05690 J=INT(52*RND)+1
05700 IF I(J)<>0 THEN 5690
05710 D(I,1)=J
05720 D(I,3)=INT((J-1)/13)+1
05730 D(I,4)=J-13*INT((J-1)/13)
05740 D(I,2)=MIN(D(I,4),10)
05750 I(J)=1
05760 NEXT I
05770 RETURN
05780 REM *****
05790 REM ** CUT FOR DEAL **
05800 REM *****
05810 PRINT "PLEASE CUT FOR DEAL ";
05820 INPUT I
05830 IF I<1 THEN 5850
05840 IF I<53 THEN 5870
05850 PRINT "BE SERIOUS NOW "
05860 GOTO 5810
05870 IF I<>INT(I) THEN 5850
05880 I1=D(I,1)
05890 PRINT "YOUR CARD IS THE ";C$(I1)
05900 J=INT(52*RND)+1
05910 IF J=I THEN 5900
05920 J1=D(J,1)
05930 PRINT " MY CARD IS THE ";C$(J1)
05940 IF D(I,4)<D(J,4) THEN 6010
05950 IF D(J,4)<D(I,4) THEN 5980
05960 PRINT "CUT AGAIN"
05970 GOTO 5820
05980 REM - COMPUTER DEALS
05990 M=0
06000 RETURN
06010 REM - PLAYER DEALS
06020 M=1
06030 RETURN
06040 REM *****
06050 REM ** DEAL **
06060 REM *****
06070 IF M=0 THEN 6100
06080 PRINT "YOU ARE DEALING "
06090 GOTO 6110
06100 PRINT "I AM DEALING"
06110 M=1-M
06120 Y=1-M
06130 PRINT
06140 PRINT "YOUR CARDS ARE"
06150 PRINT
06160 FOR I=1 TO 6
06170 K=2*I-Y
06180 L=2*I-M
06190 FOR J=1 TO 4
06200 REM - COMPUTER'S HAND
06210 M(I,J)=D(K,J)
06220 REM - PLAYER'S HAND
06230 Y(I,J)=D(L,J)
06240 NEXT J
06250 PRINT USING 6260,I,C$(Y(I,1))
06260 : (#) *****
06270 NEXT I
06280 RETURN
06290 DATA 1,2,3,4,5,6,0,1,2,3,5,4,6,0,1,2,3,6,4,5,0
06300 DATA 1,2,4,5,3,6,0,1,2,4,6,3,5,0,1,2,5,6,3,4,0
06310 DATA 1,3,4,5,2,6,0,1,3,4,6,2,5,0,1,3,5,6,2,4,0
06320 DATA 1,4,5,6,2,3,0,2,3,4,5,1,6,0,2,3,4,6,1,5,0
06330 DATA 2,3,5,6,1,4,0,2,4,5,6,1,3,0,3,4,5,6,1,2,0
06340 DATA 1,1,1,2,3,0,9,1,1,2,2,3,12,1,1,2,3,3,12
06350 DATA 1,1,2,3,4,0,8,1,2,2,2,3,0,9,1,2,2,3,3,12
06360 DATA 1,2,2,3,4,0,8,1,2,3,3,3,0,9,1,2,3,3,4,0,8
06370 DATA 1,2,3,4,4,0,8,1,2,3,4,5,0,5
06380 DATA 1,1,2,3,6,1,2,2,3,6,1,2,3,6,1,2,3,4,4
06390 DATA 1,2,3,3
06400 DATA '1','2','3','4','5','6'
06410 DATA 'A','2','3','4','5','6','7','8'
06420 DATA '9','10','J','Q','K'
06430 END

```



# BASIC

## Software

**GUARANTEE**

**SOME COMMON BASIC PROGRAMS**

BY  
LON POOLE  
MARY BORCHERS

for the  
**Apple PET™**

**SOME COMMON BASIC PROGRAMS**

OSBORNE & ASSOCIATES, INC.  
630 BANCROFT WAY, BERKELEY, CA 94710

Book/Cassette	Price	Quantity	Amount
Calif. residents add 6% sales tax. S.F. BART residents add 6-1/2 % sales tax. No tax on update subscriptions.			Subtotal California residents tax
<b>Updates:</b>			
for purchases of up to \$70.00. Invoicing U.S. approval of your account. All foreign orders on a U.S. bank.			Shipping <b>TOTAL AMOUNT            ENCLOSED</b>

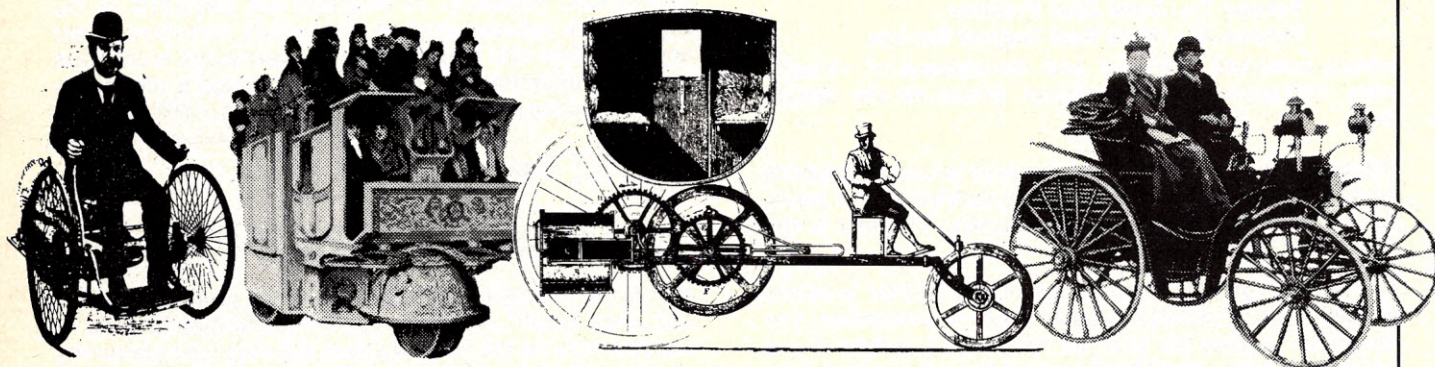


Another new game from Creative Computing . . .



# Mille Bornes

Richard Kaapke



Mille Bornes is a French game played with a special deck of cards. The name is derived from a French expression for "milestone." Your opponent is the computer.

The object is to be the first to score 5000 points by playing hands of 700 points each. At the start, each player is dealt six cards face down. In alternating turns, each player takes a card from the deck and must then play or discard one of the seven cards he is holding. Once discarded, cards are not used for the rest of the hand. There are four types of cards:

1. Distance cards. Collect these to travel the 700 miles. The distance cards must be played face-up on your side of the table (printer?) to count. Point values of the distance cards are 25, 50, 75, 100 and 200. You can't play more than two 200's in a single hand.

2. Hazard cards. Play these on your opponent to impede his progress. When a hazard card is showing on a player's side of the table, he can not play any more distance cards until it is removed. The hazard cards are: Out of Gas, Flat Tire, Accident, and Stop. There is one other hazard card, Speed Limit, which works differently. Speed Limit does not stop your opponent, but prevents him from playing distance cards greater than 50. It can be played in addition to another hazard. Otherwise you may only play one hazard on your opponent at a time.

3. Remedy cards. These remove hazard cards played on you. The remedies, which correspond with the

hazards, are: Gasoline, Spare Tire, Repairs, Roll, and End of Limit. You must always play the appropriate remedy—spare tires don't help when you're out of gas. The Roll card is special—not only does it counteract Stop, but you must also have a Roll card showing at all times to play distance cards. So you need a Roll card at the start of the game, and after playing another remedy card.

4. Safety cards. There are only four safeties in the deck. They work like super-remedies. They can be played to eliminate hazards, but they also have some special features. The safeties can be played at any time and they prevent your opponent from playing the matching hazard for the rest of the hand. Also, if you play the appropriate safety *immediately* after the computer plays a hazard, this is called a "Coup Fourre" and you collect extra points. Whenever you play a safety, you take an extra turn. The safety cards are: Extra Tank, Puncture Proof, Driving Ace, and Right-of-Way.

When one player reaches exactly 700 points, the scores for the hand are tallied. The formula used is:

- number of miles
- + number of safeties played x 100
- + 300 points if all four safeties are played by one player
- + number of coup fourres x 300
- + bonus of 400 points if the trip was completed
- + bonus of 300 points for completing a trip without using any 200's
- + bonus of 500 points for a shutout

## Computer Version

The program listing is in CP/M Microsoft Extended BASIC, but it should work with minor modifications on a TRS-80 Level II. (You will have to expand out the DEF FNI yourself.) If you want to convert this program to work on an Apple, PET, Sorcerer, or similar BASIC-speaking computer, then remember that you'll need at least 16K of memory. To figure out what some of the more obscure statements are, get a TRS-80 Level II BASIC manual at a local Radio Shack, which will tell you more than an abbreviated summary here would.

Running the game is simple. There are four commands: P to play a card, D to discard, N to print the number of cards left in the deck, and C to play a coup fourre. The computer will prompt you for the number of the card (1-7). At the end of a hand the computer will pause—press return to continue. The only difference between this implementation and the standard two-player game is that the hand is ended if the entire deck is used up, regardless of whether either player has reached 700 points yet.

The manual version of Mille Bornes, on which this program was based, is available from Parker Brothers. It's a fun game and has more detailed instructions, too.

We are considering the idea of offering a collection of large BASIC programs of this caliber on diskette (for CP/M or TRS-80) and possibly also in book form, and would like to hear from you if you have worthwhile software.

Richard Kaapke, 4485 Vision Dr. #9, San Diego CA 92121



# Boards . . . or Complete Systems

The best price and delivery is from MiniMicroMart!



## BANTAM 550 from PERKIN-ELMER

Small in size, light in weight, and low in price — but top of the list in features and performance.

- Upper and lower case
- Full 24 x 80 format
- Sharp 7 x 10 dot matrix

Get everything you want without paying for things you don't need — List \$996

NOW FROM US AT \$799

Add \$20 for anti-glare screen  
(specify gray or green)

SHIPPING: Add \$5 for East Coast; \$7.50 for Midwest; \$8.50 if you are in Pacific Time Zone.

### FLOPPY DISK INTERFACES

	OUR LIST PRICE	PRICE
Morrow Discus I . . . . .	\$995	\$849
Discus I (dual drive) . . . . .	1795	1499
Discus 2D (Double Density) . . . . .	1149	979
Disk Jockey I Controller Bd . . . . .		169
Tarbell Floppy Disk Interface . . . . .	\$190	\$169
Micromation Doubler, double-density controller . . . . .	\$495	\$419
Megabox dual-drive dbl. density system, over 1 megabyte . . . . .	.2295	2054
Mega II, over 2 megabytes . . . . .	.2995	2695
SD Computer VersaFloppy floppy disk controller board, kit . . . . .	\$159	139
Micropolis 1041 MacroFloppy . . . . .	\$695	\$625
1042 MacroFloppy w/case & P.S. . . . .		709
1053 Dual MetaFloppy . . . . .	1895	1695

#### INTRODUCTORY SPECIAL

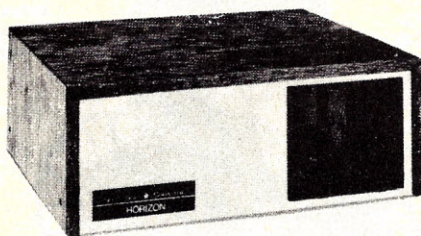
*fantastic new Xitan Disk Controller Board single and double density, handles mini and standard-size drives simultaneously, complete with CP/M compatible DOS and Xitan disk BASIC. Assem./tested List \$595 OUR PRICE \$499*

### CLOSE-OUT SPECIAL TDL SMB BOARD

Provides for Zapple ROM, 2K RAM, parallel interface, 2 serial interfaces, and tape cassette interface.

Bare Board only, w/documentation . . . . .	\$ 49.95
Complete Kit . . . . .	147.50
Assembled and Tested . . . . .	197.50
None of above include Zapple ROM or RAM.	
Zapple Monitor ROM . . . . .	29.95

## NORTH STAR HORIZON



Now Double Density

Horizon 1 Kit List \$1599 . . . . .	\$1349
Assembled/Tested List \$1899 . . . . .	1599
Horizon 2 (w/2 drives) Kit List \$1999 . . . . .	1699
Assembled/Tested List \$2349 . . . . .	1939

4 MHz Z-80 CPU Board, Kit \$199 . . . . .	169
Assembled/Tested List \$259 . . . . .	209

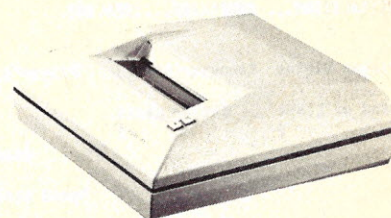
Complete Minifloppy Disk System w/BASIC and drive, Kit List \$699 . . . . .	589
Assembled/Tested List \$799 . . . . .	689

### MEMORY BOARDS

	OUR LIST PRICE	PRICE
North Star 16K Dynamic, Kit . . . . .	\$399	\$269
Assembled & Tested . . . . .	\$459	309
Dynabyte 16K Static RAM, 250ns . . . . .	\$359	
32K Static RAM, 250ns . . . . .	\$995	796
Morrow SuperRAM 16K Static 450ns, Kit . . . . .	\$299	\$269
450ns, Assembled . . . . .	334	304
4 MHz, Kit . . . . .	334	304
4 MHz, Assembled . . . . .	369	339
32K Static, 4 MHz, Kit . . . . .	\$649	579
32K Static, 4 MHz, Assem. . . . .	699	629
Cromemco 16K RAM Card w/Bank Select, Kit . . . . .	\$495	\$399
Assembled . . . . .	595	495
SD Computer ExpandoRAM w/o RAMS (no chips) . . . . .	\$139	
32K Dynamic w/8K, Kit . . . . .	189	
32K Dynamic w/16K, Kit . . . . .	237	
32K Dynamic w/32K, Kit . . . . .	Special \$329	
Vector 48K Static, Assem. . . . .	\$695	\$589

### SPECIAL — SAVE \$300

Xitan (TDL) D-32 32K Dynamic Memory Board, List \$869  
OUR PRICE: \$569



## THE PRINTERM 879

Best Printer Buy for '79

Unbelievable speed at low price — 120 cps, printing in upper and lower case with a 9 x 7 dot matrix in a bi-directional mode. Microprocessor-controlled RS232 or optional parallel interface directly compatible with TRS-80 or Cromemco System 2 or 3. Friction or pin-feed models available. Friction-feed model can use standard Teletype roll.

Friction Feed Model, List \$1395 . . . . .	\$1099
Pin-Feed Model, List \$1495 . . . . .	\$1199

### TERMINALS AND PRINTERS

Hazeltine 1500 . . . . .	\$1049
1510 . . . . .	1149
1400 . . . . .	699
Soroc 120 . . . . .	\$849
Intertube . . . . .	\$784
Lear Siegler ADM3A, assem. . . . .	\$849
Kit . . . . .	775
Teletype 43 RO, TTL (serial) . . . . .	\$874
43 KSR/Terminal, TTL (serial) . . . . .	979
T.I. 810 Printer . . . . .	\$1695
Centronics 779 w/tractor . . . . .	\$995
IP-125 Brightwriter w/1210 print control option . . . . .	\$754
IP-225 w/1210 & 1250 options . . . . .	889
DecWriter II . . . . .	\$1490
RS232 Cables . . . . .	\$25

Call or write for price and delivery information on EXIDY SORCERER

If you own a TRS-80 or Heath H-8, write for our special catalog. Many unique offerings — Save 10%-20% on TRS-80 accessories.

### SOFTWARE

Complete stock of Xitan software (formerly TDL) in inventory at substantial savings.

### MORE SPECIALS

Xitan VDB Board . . . . .	our price \$314
Xitan SMB-II, List \$395 . . . . .	\$339
The fantastic new Xitan ZPU-II . . . . .	\$319

Prices in this ad include 2% cash prepayment discount (bank transfer, check, money order, etc.). VISA and Master Charge accepted, but 2% cash discount does not apply. Slightly higher prices apply to government and institutional purchase orders when not prepaid.

Above prices subject to change and all offers subject to withdrawal without notice.

SHIPPING, HANDLING & INSURANCE: Add \$2 for boards, \$7.50 for floppy disk systems, \$12 for Horizons.

OEM and dealer inquiries invited.

— WRITE FOR FREE CATALOG —

## MiniMicroMart, Inc.

1618 James Street, Syracuse, NY 13203 (315) 479-7620 TWX 710 541-0431

CIRCLE 176 ON READER SERVICE CARD



run  
INITIALIZING... SHUFFLING... DEALING.

Player Status	Computer Status	Player's Hand
		75 (1)
End of Limit	End of Limit	100 (2)
0	0	25 (3)
		Gasoline (4)
		Roll (5)
		Speed Limit 50 (6)

You drew a Roll (7)  
Action to take ? P  
Type R, D, P, C or N: P  
Play which card (1 - 7) ? 7  
Computer played a Roll

Player Status	Computer Status	Player's Hand
Roll	Roll	75 (1)
End of Limit	End of Limit	100 (2)
0	0	25 (3)
		Gasoline (4)
		Roll (5)
		Speed Limit 50 (6)

You drew a Roll (7)  
Action to take ? P  
Play which card (1 - 7) ? 2  
Computer played a 100

Player Status	Computer Status	Player's Hand
Roll	Roll	75 (1)
End of Limit	End of Limit	100 (2)
100	100	25 (3)
		Gasoline (4)
		Roll (5)
		Speed Limit 50 (6)

You drew a Roll (7)  
Action to take ? P  
Play which card (1 - 7) ? 6  
Computer played an Accident

Player Status	Computer Status	Player's Hand
Accident	Roll	75 (1)
End of Limit	Speed Limit 50	100 (2)
100	100	25 (3)
		Gasoline (4)
		Roll (5)
		Roll (6)

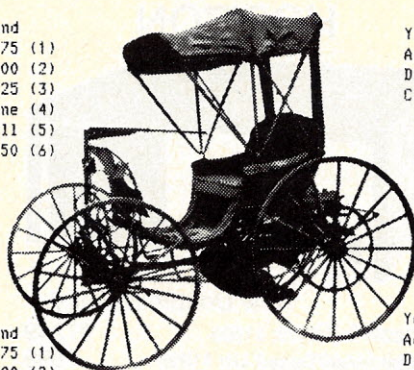
You drew a Flat Tire (7)  
Action to take ? P  
Play which card (1 - 7) ? 7  
Computer played an End of Limit

Player Status	Computer Status	Player's Hand
Accident	Flat Tire	75 (1)
End of Limit	End of Limit	100 (2)
100	100	25 (3)
		Gasoline (4)
		Roll (5)
		Roll (6)

You drew a Roll (7)  
Action to take ? D  
Discard which card (1 - 7) ? 7  
Computer discarded a 25

Player Status	Computer Status	Player's Hand
Accident	Flat Tire	75 (1)
End of Limit	End of Limit	100 (2)
100	100	25 (3)
		Gasoline (4)
		Roll (5)
		Roll (6)

You drew a Stop (7)  
Action to take ? D  
Discard which card (1 - 7) ? 3  
Computer discarded a 25



Player Status	Computer Status	Player's Hand
Accident	Flat Tire	75 (1)
End of Limit	End of Limit	100 (2)
100	100	25 (3)
		Gasoline (4)
		Roll (5)
		Roll (6)

You drew a Flat Tire (7)  
Action to take ? D  
Discard which card (1 - 7) ? 7  
Computer discarded a 25

Player Status	Computer Status	Player's Hand
Accident	Flat Tire	75 (1)
End of Limit	End of Limit	100 (2)
100	100	25 (3)
		Gasoline (4)
		Roll (5)
		Roll (6)

You drew a Stop (7)  
Action to take ? D  
Discard which card (1 - 7) ? 7  
Computer discarded a 25

Player Status	Computer Status	Player's Hand
Accident	Flat Tire	75 (1)
End of Limit	End of Limit	100 (2)
100	100	25 (3)
		Gasoline (4)
		Roll (5)
		Roll (6)

You drew a Spare Tire (7)  
Action to take ? D  
Discard which card (1 - 7) ? 1  
Computer played a Speed Limit 50

Player Status	Computer Status	Player's Hand
Accident	Flat Tire	Spare Tire (1)
Speed Limit 50	End of Limit	Roll (2)
100	100	25 (3)
		Gasoline (4)
		Roll (5)
		Roll (6)

You drew a 75 (7)  
Action to take ? D  
Discard which card (1 - 7) ? 7  
Computer discarded a 100

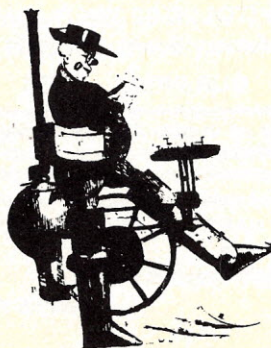
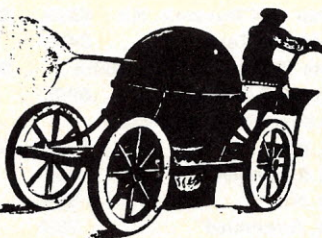
Player Status	Computer Status	Player's Hand
Accident	Flat Tire	Spare Tire (1)
Speed Limit 50	End of Limit	Roll (2)
100	100	25 (3)
		Gasoline (4)
		Roll (5)
		Roll (6)

You drew a 50 (7)  
Action to take ? D  
Discard which card (1 - 7) ? 7  
Computer discarded a 75

Player Status	Computer Status	Player's Hand
Accident	Flat Tire	Spare Tire (1)
Speed Limit 50	End of Limit	Roll (2)
100	100	25 (3)
		Gasoline (4)
		Roll (5)
		Roll (6)

You drew a 75 (7)  
Action to take ? D  
Discard which card (1 - 7) ? 7  
Computer discarded a 200

Player Status	Computer Status	Player's Hand
Accident	Flat Tire	Spare Tire (1)
Speed Limit 50	End of Limit	Roll (2)
100	100	25 (3)
		Gasoline (4)
		Roll (5)
		Roll (6)





# TAKE A CLOSER LOOK!



## THE COMMODORE PET 2001 and a FREE COURSE IN BASIC!

(If you already know BASIC, substitute program of equal value)

Buy the 8K PET and receive FREE, a computerized course in programming! Basic BASIC, by Ralph James, Ph.D., and Ronald Lodewyck, Ph.D. is an extensive series of programs which teach BASIC in a clear, interactive, and dynamic style which is only possible with a computer.

### Certain features of the PET continue to place it way ahead of ALL competition:

Complete screen editing allows INSERTION and DELETION of characters anywhere in the screen listing of a program! No retyping of lines to correct errors.

6502 Microsoft BASIC continues to be the fastest version available. REAL-TIME animation, REAL-TIME control applications, and numerous time-sensitive applications become possible with Commodore BASIC. The competitors' BASIC's are usually too slow for anything but 'static' programs!

Completely integrated self contained unit. NO 'rat's nest' of dangling wires and connectors. Single cabinet contains 9" CRT screen with crisp clear resolution, cassette tape drive, 72 key keyboard and separate numeric keypad.

Rugged heavy-duty steel cabinet-the PET is durable enough for demanding industrial applications, yet makes an attractive addition to the home environment.

Innovative file control system makes data file handling and 'input/output' operations by the cassette, printer, disk, and other peripherals easy.

Three optimized methods to expand: 1) memory expansion bus for additional RAM & ROM, 2) IEEE-488 bus for I/O expansion. The IEEE bus allows up to 15 devices 'on-line' simultaneously-ALL connected to the same port. No need for multiple expensive RS-232 or parallel ports! 3) 8 bit parallel I/O port with handshake lines for simpler applications.

**The Commodore PET is not perfect, but we are yet to see ANY competition that is as innovative in design, as durable in construction, or as versatile or fun to use as the PET.**

8K PET with Basic BASIC programming course (or equiv.) **\$795**

New 16K PET with FACTORY full sized ASCII keyboard, but does not include cassette drive (call, or write to verify) **\$995**

32 K PET with full ASCII keyboard, but w/o cassette **\$1195**

PET Printer-Impact printer with formatted printing, full graphics printing, TRACTOR feed...

...many features **\$975**

PET FLOPPY DISK, dual shugart minifloppy,

approx. 330K under internal microprocessor

CONTROL-FULL DOS **\$1095**

Prices quoted for new peripherals are preliminary and approx.



## The COMPUCOLOR II, The Best Home/Personal Computer Available. Intelligent Systems Corporation of Norcross, Georgia has been building color video graphics terminals for years, and the Compucolor II is based on the same high level software and advanced hardware design of commercial/industrial systems costing thousands of dollars more. The Compucolor II comes with the following STANDARD features!

Minifloppy disk drive, built-in, with advanced DOS, accessible through BASIC, or stand alone. Sequential, Random files.

13" color CRT STANDARD-- 32x64 characters w/graphics

16K extended DISK BASIC with FULL graphics capabilities BUILT-IN! No need for extra kludged graphics programs!

RS-232 port for printer or modem, STANDARD

Can function as an intelligent terminal for larger system

72 Key ASCII keyboard standard, with many extra features

Large selection of software on diskette, with more coming

User group and newsletter

**IT MAY BE HARD TO BELIEVE, BUT THE ABOVE SYSTEM WITH 16K USER RAM, 2 FREE DISKETTES (W/4.5 PROGRAMS EACH) IS ONLY \$1695!**

2nd Minifloppy disk drive, 52K **\$400**

Optional 117 Key keyboard (numeric cluster, etc.) **\$225**

SOFTWARE DISKETTES, **\$19.95 EACH** (contain 4-6 programs each)

Star Trek, Othello, Chess, Math Tutor, Sampler (free w/CCII)

Black Jack, Personal Finance 1, Personal Finance

2, Bonds & Securities, Equity.

Personal Data Base **\$29.95**; Text Editor **\$24.95**;

Assembler **\$24.95**; Programming manual **\$25**;

Maintenance Manual **\$50**.

**Write for further details!**

**Compare with the TRS-80 and Apple III!**

Plainsman Micro Systems

P.O. Box 1712 B

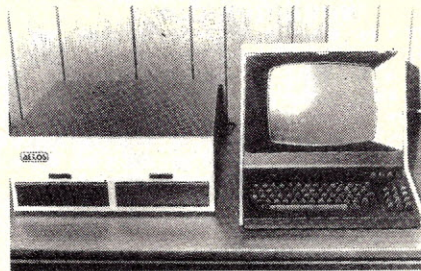
Auburn, Alabama 36830

**800-633-8724** (Div. 5C Corp)

Master Charge/Visa: Free UPS Shipping on all orders prepaid with cashier's check (heavy items shipped freight collect)

**Unless otherwise stated, all items assembled, tested, warranted 90 days for parts and labor**

Sales & Service for OSI, Altos, Commodore, Compucolor & HDE



## ALTOS ACS-8000 SUN SERIES: a new standard in CP/M based systems

Single board construction for highest bandwidth, signal purity, reliability, ease of maintenance, and lowest cost.

4 mhz. Z80 w/32K 200 nanosecond 4116 RAM,

sockets for 64K

Dual Shugart 8" drives-single density/sided standard;

double density and/or double sided drives optional.

28 megabyte hard disk (Shugart) available this summer in matching cabinet.

Large prototyping board available for custom applications; installs next to main board. (room for 75 16 pin ICs)

2 accessory AC outlets for printer, terminal, etc.

2 RS-232 and one 16 bit parallel port standard.

PASCAL, COBOL, CBASIC, FORTRAN, and Z80 macro assembler

90 day warranty for parts/labor.

When high bandwidth (high speed), low cost, and reasonable expandability are considered, the price/performance advantages of a single board design far outweigh the advantages of a so called 'standard' bus configuration. Why pay thousands more for lower performance? Altos decided that hardware requirements were adequately met with a single "6x9" board!

ACS-8000-1, 32K, single density/sided (500Kbyte)

**\$3840.00**

ACS-8000-2, 32K, double density/sing. sided

(1 mbyte) **\$4500.00**

ACS-8000-3, 32K, single density/doub. sided

(1mbyte) **\$4800.00**

ACS-8000-4, 32 K, double density/doub. sided

(2 mbyte) **\$5300.00**

additional 16K ram- **\$99**; proto board w/connector

**\$150.00**

CP/M free with computer: CBASIC **\$100.00**;

Fortran IV **\$500.00**; PASCAL **\$200.00**;

COBOL **\$770.00**; Z80 macro assembler **\$100.00**

**ALL ITEMS AVAILABLE NOW!**

### SAVE BY BUYING COMPLETE SYSTEMS!

ALTOS SYSTEM (1):

ACS-8000-1, 32 K, W/CP/M, Altos utilities- **\$3840**

CBASIC **\$100**

Hazeltine 1500 with full end-user warranty! (90 day parts, labor, usually ON-SITE, from Hazeltine! **\$1195**

TEXAS INSTRUMENTS 810 printer, with RS-232-

(with full factory warranty!) Comparable to Centronics 703) **\$1895**

Printer Cable **\$35**

ALTOS SYSTEM (1), list price **\$7065**

SPECIAL SYSTEM PRICE **\$6895**

Beware of the poor warranties most 'bargain basement' peripherals include! ALL peripherals (unless otherwise stated) from Plainsman Micro Systems include the FULL (usually on-site) WARRANTY and service from the manufacturer.

### VISIT OUR RETAIL STORES!

**The Logic Store**  
Columbus Square Mall  
3050 Macon Road  
Columbus, Georgia  
(404)568-0197  
R.N. Clemmons, Mgr.

**The Logic Store**  
3808 Pepperell Parkway  
Opelika, Alabama  
(205)745-7735  
William Carroll, Mgr.

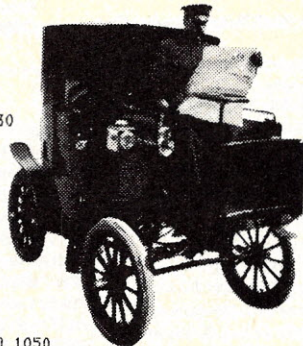




```

list
1 CLEAR 1000
5 DEF FNIZ(VZ) = -(VZ=V9Z OR VZ=W1Z OR VZ=V8Z OR VZ=V4Z)
10 DIM A$(19), D$(19), AZ(5), DX(101),
    IX(101), CZ(7), PX(7)
20 V1Z = 1: V2Z = 2: V3Z = 3: V4Z = 4: V5Z = 5:
    V6Z = 6: V7Z = 7: V8Z = 8: V9Z = 9: V0Z = 10:
    W1Z = 11: W2Z = 12: W3Z = 13: W4Z = 14: W5Z = 15:
    W6Z = 16: W7Z = 17: W8Z = 18: W9Z = 19: FZ = 1
30 N1Z = 10: N2Z = 10: N3Z = 10: N4Z = 12: N5Z = 4:
    N6Z = 2: N7Z = 6: N8Z = 1: N9Z = 2: N0Z = 6:
    Q1Z = 1: Q2Z = 2: Q3Z = 6: Q4Z = 1: Q5Z = 3:
    Q6Z = 6: Q7Z = 4: Q8Z = 14: Q9Z = 1
40 Q0Z = N1Z + N2Z + N3Z + N4Z + N5Z + N6Z + N7Z + N8Z +
    N9Z + N0Z + Q1Z + Q2Z + Q3Z + Q4Z + Q5Z + Q6Z +
    Q7Z + Q8Z + Q9Z
50 A$(0) = SPACE$(14):
    FOR IX = 1 TO 19:
        READ X$:
        A$(IX) = SPACE$(14-LEN(X$)) + X$:
    NEXT IX
60 DATA "25", "50", "75", "100", "200", "Out of Gas",
    "Gasoline", "Extra Tank", "Flat Tire",
    "Spare Tire", "Puncture-proof", "Accident",
    "Repairs", "Driving Ace", "Speed Limit 50",
    "End of Limit", "Stop", "Roll", "Right-of-way"
70 FOR JZ = 1 TO 19:
    FOR JX = 1 TO LEN(A$(JZ)):
        IF MID$(A$(JZ), JX, 1) <> " " THEN 80
    NEXT JX
75 T$ = RIGHT$(A$(JZ), 15-JX):
80 IF INSTR("AEQ", MID$(T$, 1, 1)) THEN
    D$(JZ) = "n" + T$ ELSE
    D$(JZ) = " " + T$
85 NEXT JZ:
    FOR JZ = 1 TO 5: READ AZ(JZ): NEXT
100 DATA 25, 50, 75, 100, 200
1000 PRINT "INITIALIZING...": GOSUB 1490:
    PRINT "SHUFFLING...": GOSUB 1550:
    PRINT "DEALING...": GOSUB 1560
1010 IF FZ=0 THEN PRINT "Computer played a": D$(P1Z)
1011 IF P1Z=V8Z OR P1Z=W4Z OR P1Z=W9Z OR P1Z=W1Z THEN 1440
1020 IF C3Z=700 THEN T$="C": GOTO 3000
1030 GOSUB 1600: IF TZ<0 THEN 1480
1031 PX(7) = TZ
1040 IF X0Z<>7 THEN GOSUB 5000
1045 PRINT "You drew a": D$(PX(7)): " (7)": FZ = 1
1050 PRINT "Action to take ?":
1060 GOSUB 4000:
    IF INSTR("NRDPC", V$)=0 THEN
        PRINT "Type R, D, P, C or N:": GOTO 1060
1062 IF V$="R" THEN X0Z = 0: GOTO 1040
1063 IF V$="" THEN 1050
1064 IF V$="N" THEN PRINT "Number of cards remaining is": Q0Z-D4Z: GOTO 1050
1065 IF V$="P" THEN PRINT "Play ": ELSE
    IF V$="D" THEN PRINT "Discard ": ELSE
    IF V$="C" THEN PRINT "Coup fourre ":
1070 INPUT "which card (1 - 7) ": C1Z
1071 IF C1Z<0 THEN 1050 ELSE
    IF C1Z>7 OR C1Z<1 THEN 1070
1075 IZ = C1Z: C1Z = PX(C1Z)
1080 IF V$<>"C" THEN 1180
1085 IF IZ=7 THEN 1130
1090 IF C1Z=W9Z THEN
    IF P1Z<W7Z AND P1Z<W5Z THEN 1130
    ELSE P8Z = 1: GOTO 1140
1100 IF C1Z=V8Z THEN
    IF P1Z<V6Z THEN 1130
    ELSE P9Z = 1: GOTO 1140
1110 IF C1Z=W1Z THEN
    IF P1Z<V9Z THEN 1130
    ELSE P7Z = 1: GOTO 1140
1120 IF C1Z=W4Z THEN
    IF P1Z<W2Z THEN 1130
    ELSE P6Z = 1: GOTO 1140
1130 PRINT "IMPROPER ACTION TAKEN": GOTO 1050
1140 P4Z = P4Z+1: P5Z = P5Z+1
1150 IF C1Z=W9Z THEN
    IF R1Z<0 THEN R1Z = 0:
    IF P0Z=W2Z OR P0Z=V6Z OR P0Z=V9Z THEN 1415
1160 P0Z = W8Z: GOTO 1415
1180 IF V$<>"P" THEN 1410
1190 IF C1Z<=V5Z THEN
    IF (P0Z<W8Z OR (C1Z<V2Z AND R1Z<0)) OR
        (C1Z=V5Z AND P3Z=2) OR (P2Z+AZ(C1Z) > 700) THEN 1130
    ELSE P2Z = P2Z+AZ(C1Z):
    P3Z = P3Z -(C1Z=V5Z): GOTO 1400
1220 IF C1Z=V7Z THEN
    IF P0Z<V6Z THEN 1130
    ELSE P0Z = V7Z: P0Z = -P0Z*(P8Z<1) -W8Z*(P8Z=1):
    GOTO 1400

```



```

1230 IF C1Z=V0Z THEN
    IF P0Z<V9Z THEN 1130
    ELSE P0Z = V0Z: P0Z = -P0Z*(P8Z<1) -W8Z*(P8Z=1):
    GOTO 1400
1250 IF C1Z=W3Z THEN
    IF P0Z<W2Z THEN 1130
    ELSE P0Z = W3Z: P0Z = -P0Z*(P8Z<1) -W8Z*(P8Z=1):
    GOTO 1400
1270 IF C1Z=W8Z THEN
    IF P0Z=V6Z OR P0Z=V9Z OR P0Z=W2Z OR P0Z=W8Z THEN 1130
    ELSE P0Z = W8Z: GOTO 1400
1290 IF C1Z=V9Z OR C1Z=V6Z OR C1Z=W2Z OR C1Z=W7Z THEN
    IF (D1Z<W8Z OR (C1Z=V9Z AND C8Z=1) OR
        (C1Z=V6Z AND C0Z=1) OR (C1Z=W2Z AND C7Z=1) OR
        (C1Z=W7Z AND C9Z=1)) THEN 1130
    ELSE D1Z = C1Z: GOTO 1400
1310 IF C1Z=W6Z THEN
    IF R1Z=0 THEN 1130
    ELSE R1Z = 0: GOTO 1400
1330 IF C1Z=W5Z THEN
    IF (D2Z=1 OR C9Z=1) THEN 1130
    ELSE D2Z = 1: GOTO 1400
1350 IF C1Z=V8Z THEN
    P0Z = -P0Z*(P0Z<V6Z) -W8Z*(P0Z=V6Z):
    P9Z = 1: GOTO 1400
1360 IF C1Z=W1Z THEN
    P0Z = -P0Z*(P0Z<V9Z) -W8Z*(P0Z=V9Z): P7Z = 1: GOTO 1400
1370 IF C1Z=W4Z THEN
    P0Z = -P0Z*(P0Z<W2Z) -W8Z*(P0Z=W2Z): P6Z = 1: GOTO 1400
1380 IF C1Z=W9Z THEN
    IF P0Z=W7Z OR P0Z=0 OR P0Z=W3Z OR P0Z=V0Z OR P0Z=V7Z THEN
        P0Z = W8Z
1381 IF C1Z=W9Z THEN R1Z = 0: P8Z = 1: GOTO 1400
1390 GOTO 1130
1400 IF C1Z=W9Z OR C1Z=W1Z OR C1Z=V8Z OR C1Z=W4Z THEN
    P5Z = P5Z+1
1405 GOTO 1415
1410 C1Z = 0
1415 X0Z = 0: IF IZ<>7 THEN PX(IZ) = PX(7)
1420 IF C1Z=V8Z OR C1Z=W1Z OR C1Z=W9Z OR C1Z=W4Z THEN
    X0Z = 7: GOTO 1010
1430 IF P2Z=700 THEN T$="P": GOTO 3000
1440 FZ = 0: GOSUB 1600: IF TZ<0 THEN 1480 ELSE
    CZ(7) = TZ: GOSUB 1930: IF TZ<0 THEN 1440
1450 IF D1Z=W8Z THEN GOSUB 1870: IF TZ<0 THEN 1010 ELSE
    GOSUB 1860: IF TZ<0 THEN 1010 ELSE GOSUB 1650:
    IF TZ<0 THEN 1010 ELSE GOSUB 1680:
    IF TZ<0 THEN 1010 ELSE GOSUB 1750: IF TZ<0 THEN 1010 ELSE
    GOSUB 1770: IF TZ<0 THEN 1010 ELSE 1470
    GOSUB 1860: IF TZ<0 THEN 1010 ELSE
    GOSUB 1780: IF TZ<0 THEN 1010 ELSE
    GOSUB 1680: IF TZ<0 THEN 1010 ELSE
    GOSUB 1750: IF TZ<0 THEN 1010
1470 GOSUB 2000: GOTO 1010
1480 X0Z = 0: PRINT: PRINT: PRINT " * * * END OF DECK * * *":
    T$="N": GOTO 3000
1490 FOR ZX = 0 TO N1Z-1: IZ(ZX) = V1Z: NEXT:
    Z1Z = N1Z:
    FOR ZX = 0 TO N2Z-1: IZ(Z1Z+ZX) = V2Z: NEXT:
    Z1Z = Z1Z+N2Z:
    FOR ZX = 0 TO N3Z-1: IZ(Z1Z+ZX) = V3Z: NEXT:
    Z1Z = Z1Z+N3Z:
    FOR ZX = 0 TO N4Z-1: IZ(Z1Z+ZX) = V4Z: NEXT:
    Z1Z = Z1Z+N4Z:
    FOR ZX = 0 TO N5Z-1: IZ(Z1Z+ZX) = V5Z: NEXT:
    Z1Z = Z1Z+N5Z:
    FOR ZX = 0 TO N6Z-1: IZ(Z1Z+ZX) = V6Z: NEXT:
    Z1Z = Z1Z+N6Z:
    FOR ZX = 0 TO N7Z-1: IZ(Z1Z+ZX) = V7Z: NEXT:
    Z1Z = Z1Z+N7Z:
    FOR ZX = 0 TO N8Z-1: IZ(Z1Z+ZX) = V8Z: NEXT:
    Z1Z = Z1Z+N8Z:
    FOR ZX = 0 TO N9Z-1: IZ(Z1Z+ZX) = V9Z: NEXT:
    Z1Z = Z1Z+N9Z:
    FOR ZX = 0 TO N0Z-1: IZ(Z1Z+ZX) = V0Z: NEXT:
    Z1Z = Z1Z+N0Z:
    FOR ZX = 0 TO Q1Z-1: IZ(Z1Z+ZX) = W1Z: NEXT:
    Z1Z = Z1Z+Q1Z:
    FOR ZX = 0 TO Q2Z-1: IZ(Z1Z+ZX) = W2Z: NEXT:
    Z1Z = Z1Z+Q2Z:
    FOR ZX = 0 TO Q3Z-1: IZ(Z1Z+ZX) = W3Z: NEXT:
    Z1Z = Z1Z+Q3Z:
    FOR ZX = 0 TO Q4Z-1: IZ(Z1Z+ZX) = W4Z: NEXT:
    Z1Z = Z1Z+Q4Z:
    FOR ZX = 0 TO Q5Z-1: IZ(Z1Z+ZX) = W5Z: NEXT:
    Z1Z = Z1Z+Q5Z:
    FOR ZX = 0 TO Q6Z-1: IZ(Z1Z+ZX) = W6Z: NEXT:
    Z1Z = Z1Z+Q6Z

```





# NEECO

PET 2001 — 32K



LARGE TYPEWRITER KEYBOARDS NOW AVAILABLE!

## PROUDLY ANNOUNCES THE NEWEST PET MICROCOMPUTERS BY COMMODORE!

The PET™ is now a truly sophisticated  
Business System with the  
announcement of these Peripherals.

The PET™, incorporated with the Floppy Disk and Printer makes an ideal business system for most professional and specialized fields: medicine, law, dental, research, engineering, toolmaking, printing, education, energy conservation, etc. The PET™ Business System as a management tool, delivers information to all levels of Business, previously attainable only with equipment many times more expensive. The PET™ Business System is one of the most cost efficient business tools

today, it offers a wide range of applications from logging management strategy in major corporations to organizing accounts and inventory control of small businesses. Here are just a few of the cost-saving uses in the corporation, professional office or small business: stock control, purchasing, forecasting, manufacturing costing, customer records, mailing lists, etc. The PET™, Floppy Disk and Printer, a compatible business system at a reasonable price — Take a closer look at these Peripherals...

PRODUCT	DESCRIPTION	PRICE	AVAILABILITY
PET 2001 — 4K*	4K RAM	\$ 595	IMMEDIATE
PET 2001 — 8K*	8K RAM	\$ 795	IMMEDIATE
PET 2001 — 16K LARGE KEYS	16K RAM	\$ 995	IMMEDIATE
PET 2001 — 32K LARGE KEYS	32K RAM	\$1195	IMMEDIATE
PET 2041	SINGLE FLOPPY	\$ 595	JULY-AUGUST
PET 2022 PRINTER	TRACTOR/ROLL	\$ 995	JULY-AUGUST
PET 2023	ROLL FEED	\$ 850	JULY-AUGUST
PET 2040	DUAL FLOPPY	\$1095	JULY-AUGUST
NEW PET USER MANUAL		\$ 10	IMMEDIATE

\* THESE UNITS INCLUDE THE C2N CASSETTE AND SMALL KEYBOARD. THE FULL SIZE KEYBOARD UNITS DO NOT INCLUDE A BUILT IN CASSETTE—ORDER C2N

NEECO IS NOW ACCEPTING \$25 DEPOSITS ON THE SYSTEM COMPONENTS OF YOUR CHOICE! PURCHASE ORDERS ARE ACCEPTED IN LIEU OF DEPOSITS. NEECO IS A FULL CUSTOMER SERVICE ORIENTED COMPANY. PLEASE CALL FOR ADDITIONAL INFORMATION

## THE NEW commodore PET PERIPHERALS!



2040

### Dual Drive Floppy Disk

The Dual Drive Floppy is the latest in Disk technology with extremely large storage capability and excellent file management. As the Commodore disk is an "Intelligent" peripheral, it uses none of the RAM (user) memory of the PET™. The Floppy Disk operating system used with the PET™ computer enables a program to read or write data in the background while simultaneously transferring data over the IEEE to the PET™. The Floppy Disk is a reliable low cost unit, and is convenient for high speed data transfer. Due to the latest technological advances incorporated in this disk, a total of 360K bytes are available in the two standard 5¼" disks, without the problems of double tracking or double density. This is achieved by the use of two microprocessors and fifteen memory I.C.s built into the disk unit. Only two connections are necessary — an A/C cord and PET™ interface cord.



2022

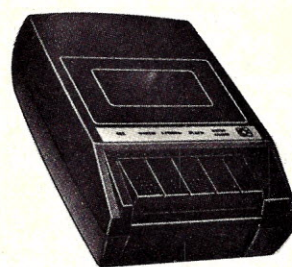
### Tractor Feed Printer

The Tractor Feed Printer is a high specification printer that can print onto paper (multiple copies) all the PET™ characters — letters (upper and lower case), numbers and graphics available in the PET™. The tractor feed capability has the advantage of accepting mailing labels, using standard preprinted forms (customized), cheque printing for salaries, payables, etc. Again, the only connections required are an A/C cord and PET™ connecting cord. The PET™ is programmable, allowing the printer to format print for: width, decimal position, leading and trailing zero's, left margin justified, lines per page, etc. It accepts 8½" paper giving up to four copies. Bidirectional printing enables increased speed of printing.

## NEW IBM SELECTRIC II TYPEWRITERS FOR PET! (BRAND NEW IBM II)



PLUG COMPATIBLE VIA USER PORT! WORD PROCESSING SOFTWARE AVAILABLE FROM NEECO. CALL FOR INFO! IBM FOR PET \$1995.



\$99<sup>95</sup>

C2N SECOND CASSETTE

NEW ENGLAND AREA SUB-DEALERSHIP INQUIRIES INVITED!

NEECO NOW OFFERS A FULL SIX MONTH WARRANTY ON ALL PETS SOLD BY NEECO! FEEL FREE TO CALL US FOR THE LATEST INFORMATION ON THE NEW PET PERIPHERALS. REMEMBER, A \$25 DEPOSIT (OR A PURCHASE ORDER) WILL BACKORDER AND HOLD ANY SYSTEM COMPONENT OF YOUR CHOICE!—WHY NOT BUY FROM THE BEST!—NEECO OFFERS THE BEST IN CUSTOMER SERVICE!—NEECO OFFERS COMPLETE SOFTWARE (COMMERCIAL & CONSUMER) SUPPORT!—MANY PACKAGES AVAILABLE! CALL FOR MORE INFO!—ARE YOU ON OUR MAILING LIST?

# NEECO

NEW ENGLAND ELECTRONICS CO., INC.  
679 HIGHLAND AVE., NEEDHAM, MASS. 02194  
MON.-FRI. 9:30-5:30

(617) 449-1760

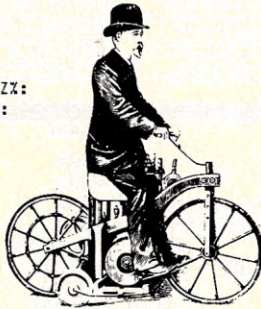
MASTER CHARGE/VISA ACCEPTED



```

1530 FOR ZX = 0 TO Q7X-1: IX(Z1X+ZX) = W7X: NEXT:
      Z1X=Z1X+Q7X:
      FOR ZX = 0 TO Q8X-1: IX(Z1X+ZX) = W8X: NEXT:
      Z1X=Z1X+Q8X:
      FOR ZX = 0 TO Q9X-1: IX(Z1X+ZX) = W9X: NEXT:
      Z1X=Z1X+Q9X:
1540 C3X=0: P2X=0: C4X=0: P3X=0: C5X=0: P4X=0: C6X=0:
      P5X=0: C8X=0: P6X=0: C7X=0: P7X=0: C9X=0: P8X=0:
      C0X=0: P9X=0: D1X=0: P0X=0: D2X=0: R1X=0: D4X=0:
      RETURN
1550 FOR ZX = 0 TO Q0X - 1:
      RX = INT(RND(1)*(Q0X-ZX)):
      DX(ZX) = IX(RX):
      IF Q0X-1-ZX<RX THEN 1555
1554 FOR Z1X = RX TO Q0X-1-ZX:
      IX(Z1X) = IX(Z1X+1):
      NEXT Z1X
1555 NEXT ZX: RETURN
1560 FOR ZX = 1 TO 6:
      GOSUB 1600:
      IF TX<0 THEN 1580 ELSE
      PX(ZX) = TX:
      GOSUB 1600:
      IF TX<0 THEN 1580 ELSE
      CX(ZX) = TX
1570 NEXT ZX: RETURN
1580 PRINT: PRINT: PRINT " * * * INITIAL DEAL FAILURE * * * ":
      STOP
1600 IF D4X=Q0X THEN TX = -1: RETURN
1610 D4X = D4X+1:
      TX = DX(D4X-1):
      RETURN
1650 TX = 0: IF D2X<0 THEN RETURN
1660 TX = V5X:
      IF C4X<2 AND C3X<525 THEN GOSUB 1900: IF TX<0 THEN 1670
1661 TX = V4X:
      IF C3X<625 THEN GOSUB 1900: IF TX<0 THEN 1670
1662 RETURN
1670 C3X = C3X+AX(P1X): C4X = C4X -(P1X=V5X):
      TX = -1: RETURN
1680 IF P0X<W8X THEN TX = W5X:
      IF R1X=0 AND P8X=0 THEN GOSUB 1900:
      IF TX<0 THEN 1730
1681 IF P0X<W8X THEN RETURN
1700 TX = V9X:
      IF P7X=0 THEN GOSUB 1900: IF TX<0 THEN 1740
1701 TX = V6X:
      IF P9X=0 THEN GOSUB 1900: IF TX<0 THEN 1740
1702 TX = W2X:
      IF P6X=0 THEN GOSUB 1900: IF TX<0 THEN 1740
1710 TX = W7X:
      IF P8X=0 THEN GOSUB 1900: IF TX<0 THEN 1740
1711 TX = W5X:
      IF R1X=0 AND P8X=0 THEN GOSUB 1900: IF TX<0 THEN 1730
      RETURN
1712 R1X = 1: TX = -1: RETURN
1740 P0X = P1X: TX = -1: RETURN
1750 IF D2X<0 THEN TX = W6X: GOSUB 1900:
      IF TX<0 THEN 1760
      ELSE TX = W9X: GOSUB 1900:
      IF TX<0 THEN 1760
1755 RETURN
1760 D2X = 0:
      IF P1X=W9X THEN 1840 ELSE TX = -1: RETURN
1770 TX = V3X:
      IF D2X=0 AND C3X<650 THEN GOSUB 1900:
      IF TX<0 THEN 1670
1771 TX = V2X:
      IF C3X<675 THEN GOSUB 1900: IF TX<0 THEN 1670
1772 TX = V1X: GOSUB 1900: IF TX<0 THEN 1670 ELSE RETURN
1780 IF D1X=W7X OR D1X=W3X OR D1X=V7X OR D1X=V0X OR D1X=0
      THEN TX = W8X: GOSUB 1900:
      IF TX<0 THEN 1820 ELSE
      TX = W9X: GOSUB 1900:
      IF TX<0 THEN 1830 ELSE RETURN
1790 IF D1X=W2X THEN TX = W4X: GOSUB 1900:
      IF TX<0 THEN 1830 ELSE
      TX = W3X: GOSUB 1900:
      IF TX<0 THEN 1820 ELSE RETURN
1800 IF D1X=V9X THEN TX = W1X: GOSUB 1900:
      IF TX<0 THEN 1830 ELSE
      TX = V0X: GOSUB 1900:
      IF TX<0 THEN 1820 ELSE RETURN
1810 IF D1X=V6X THEN TX = V8X: GOSUB 1900:
      IF TX<0 THEN 1830 ELSE
      TX = V7X: GOSUB 1900:
      IF TX<0 THEN 1820
1815 RETURN
1820 D1X = P1X: D1X = -D1X*(C9X<1) -W8X*(C9X=1):
      TX = -1: RETURN
1830 D1X = W8X:
      IF P1X=W9X AND D2X<0 THEN D2X=0

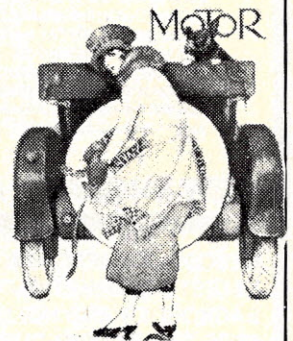
```



```

1840 C6X = C6X+1: C8X = -C8X*(P1X<W1X) -(P1X=W1X):
      C0X = -C0X*(P1X<V8X) -(P1X=V8X):
      C9X = -C9X*(P1X<W9X) -(P1X=W9X):
      D2X = -D2X*(P1X<W9X): C7X = -C7X*(P1X<W4X) -(P1X=W4X)
1841 IF (D1X=V6X AND P1X=V8X) OR (D1X=V9X AND P1X=W1X) OR
      (D1X=W2X AND P1X=W4X) OR
      (P1X=W9X AND (D1X=V7X OR D1X=V0X OR D1X=W3X OR D1X=W7X)) THEN
      D1X = W8X
1842 TX = -1: RETURN
1850 TX = W9X: GOSUB 1900: IF TX<0 THEN 1840 ELSE
      TX = W1X: GOSUB 1900: IF TX<0 THEN 1840 ELSE
      TX = W4X: GOSUB 1900: IF TX<0 THEN 1840 ELSE
      TX = V8X: GOSUB 1900: IF TX<0 THEN 1840 ELSE
      RETURN
1860 TX = 0: IF P0X<W8X OR P2X<500 THEN RETURN ELSE
      IF R1X<0 AND P2X<650 THEN RETURN ELSE
      IF P2X<600 AND P2X<500 THEN RETURN ELSE
      IF P3X<500 AND P3X=2 THEN RETURN ELSE
      GOSUB 1850: RETURN
1870 TX = 0:
      IF D1X<W8X OR C3X<500 THEN RETURN ELSE
      IF D2X<0 AND C3X<650 THEN RETURN ELSE
      IF C3X<600 AND C3X<500 THEN RETURN ELSE
      IF C3X=500 AND C4X=2 THEN RETURN ELSE
      Z1X = 700-C3X
      FOR Z2X = 1 TO 5:
      IF AZ(Z2X)=Z1X THEN 1890
1881 NEXT Z2X: PRINT: PRINT: PRINT " * * * COMPUTER SEARCH ERROR * * * ":
      STOP
1890 CTX = Z1X: GOSUB 2250:
      IF ZX=0 THEN RETURN ELSE
      GOSUB 1850: IF TX<0 THEN RETURN ELSE
      GOSUB 1650: IF TX<0 THEN RETURN ELSE
      GOSUB 1770: IF TX<0 THEN RETURN ELSE
      PRINT: PRINT: PRINT " * * * COMPUTER PLAY ERROR * * * ":
      STOP
1900 LX = 6
1905 FOR IX = 1 TO LX+1:
      IF TX=IX THEN P1X = TX: CX(IX) = CX(7):
      TX = -1: RETURN
1910 NEXT IX: TX = 0: RETURN
1920 LX = 5: GOTO 1905
1930 IF C1X=W7X OR C1X=W5X THEN TX = W9X:
      GOSUB 1920: IF TX<0 THEN 1970 ELSE
      RETURN
1940 IF C1X=V6X THEN TX = V8X:
      GOSUB 1920: IF TX<0 THEN 1970 ELSE RETURN
1950 IF C1X=V9X THEN TX = W1X: GOSUB 1920:
      IF TX<0 THEN 1970 ELSE RETURN
1960 IF C1X=W2X THEN TX = W4X:
      GOSUB 1920: IF TX<0 THEN 1970
      RETURN
1965 C5X = C5X+1: C8X = -C8X*(P1X<W1X) -(P1X=W1X):
      C0X = -C0X*(P1X<V8X) -(P1X=V8X):
      C9X = -C9X*(P1X<W9X) -(P1X=W9X):
      C7X = -C7X*(P1X<W4X) -(P1X=W4X):
      PRINT: PRINT " * * * Coup Fourre' * * * ": FX = 1
1980 TX = P1X: C6X = C6X+1:
      IF P1X=W9X THEN
      IF D2X<0 THEN D2X=0:
      IF D1X=W2X OR D1X=V6X OR D1X=V9X THEN 1995
1990 D1X = W8X
1995 TX = -1: RETURN
2000 IF P6X=1 THEN TX = W2X: GOSUB 1900:
      IF TX<0 THEN 2240
2010 IF P9X=1 THEN TX = V6X: GOSUB 1900:
      IF TX<0 THEN 2240
2020 IF P7X=1 THEN TX = V9X: GOSUB 1900:
      IF TX<0 THEN 2240
2030 IF P8X=1 THEN TX = W5X: GOSUB 1900:
      IF TX<0 THEN 2240 ELSE
      TX = W7X: GOSUB 1900:
      IF TX<0 THEN 2240
2040 IF C3X<500 THEN TX = V5X: GOSUB 1900:
      IF TX<0 THEN 2240
2050 IF C3X<600 THEN TX = V4X: GOSUB 1900:
      IF TX<0 THEN 2240
2060 IF C3X<625 THEN TX = V3X: GOSUB 1900:
      IF TX<0 THEN 2240
2070 IF C3X<650 THEN TX = V2X: GOSUB 1900:
      IF TX<0 THEN 2240
2080 CTX = V5X: GOSUB 2250:
      IF ZX>2 THEN TX = V5X:
      GOSUB 1900: IF TX<0 THEN 2240
2090 CTX = W4X: GOSUB 2250:
      IF ZX<0 OR C7X=1 THEN TX = W3X: GOSUB 1900:
      IF TX<0 THEN 2240
2100 CTX = W8X: GOSUB 2250:
      IF ZX<0 OR C0X=1 THEN TX = V7X: GOSUB 1900:
      IF TX<0 THEN 2240

```





```

2110 CTX = W1X: GOSUB 2250:
IF ZX<0 OR C8X=1 THEN TX = V0X: GOSUB 1900:
IF TX<0 THEN 2240
2120 CTX = W9X: GOSUB 2250:
IF ZX<0 OR C9X=1 THEN TX = W6X: GOSUB 1900:
IF TX<0 THEN 2240 ELSE
TX = W8X: GOSUB 1900: IF TX<0 THEN 2240
2130 TX = V1X: GOSUB 1900:
IF TX<0 THEN 2240 ELSE
TX = V2X: GOSUB 1900:
IF TX<0 THEN 2240 ELSE
TX = V3X: GOSUB 1900:
IF TX<0 THEN 2240
2140 CTX = W6X: GOSUB 2250:
IF ZX>1 THEN TX = W6X: GOSUB 1900:
IF TX<0 THEN 2240
2150 CTX = W3X: GOSUB 2250:
IF ZX>1 THEN TX = W3X: GOSUB 1900:
IF TX<0 THEN 2240
2160 CTX = V0X: GOSUB 2250:
IF ZX>1 THEN TX = V0X: GOSUB 1900:
IF TX<0 THEN 2240
2170 CTX = V7X: GOSUB 2250:
IF ZX>1 THEN TX = V7X: GOSUB 1900:
IF TX<0 THEN 2240
2180 CTX = W8X: GOSUB 2250:
IF ZX>3 THEN TX = W8X: GOSUB 1900:
IF TX<0 THEN 2240
2190 TX = V4X: GOSUB 1900: IF TX<0 THEN 2240
2200 TX = V5X: GOSUB 1900: IF TX<0 THEN 2240
2210 IF FN1X(CX(7))<>1 THEN 2230
2220 FOR ZX = 1 TO 6:
IF FN1X(CX(ZX))=0 THEN TX = CX(ZX): GOSUB 1900:
IF TX<0 THEN 2240
2225 NEXT ZX: PRINT: PRINT: PRINT " * * * SAFETY DISCARD ERROR * * * ":
STOP
2230 P1X = CX(7)
2240 PRINT "Computer discarded a"; D$(P1X):
TX = 0: FX = 1: RETURN
2250 ZX = 0:
FOR Z1X = 1 TO 6:
ZX = ZX - (CX(Z1X)=CTX):
NEXT Z1X: RETURN
3000 FX = 1: X0X = 0: X$ = I$: GOSUB 5000
3001 F$ = "#####": F1$="#####": PRINT: PRINT: PRINT, "Player", "Computer":
PRINT "Previous Total",: PRINTUSING F$; 09X;:PRINT,: PRINT USING F1$; A9X:
PRINT "Mile Stones",: PRINTUSING F$; P2X;:PRINT,: PRINTUSING F1$; C3Z:
09X = 09X+P2X: A9X = A9X+C3Z
3010 Z1X = P5X+100: Z2X = C6X+100: Z1X = Z1X-300*(Z1X=400):
Z2X = Z2X-300*(Z2X=400): PRINT "Safeties",:
PRINT USING F$; Z1X;:PRINT,: PRINT USING F1$; Z2X
3011 09X = 09X+Z1X: A9X = A9X+Z2X:
PRINT "Coup Fourre's",: PRINT USING F$; P4X+300;:PRINT,:
PRINT USING F1$; C5X+300: 09X = 09X + P4X+300:
A9X = A9X + C5X+300
3015 Z1X=0: Z2X=0: Z3X=0: Z4X=0: Z5X=0: Z6X=0
3020 PRINT "Trip Completed",:
IF X$="P" THEN Z1X = 400: Z2X = -300*(P3Z=0):
Z3X = -500*(C3Z=0)
3030 IF X$="C" THEN Z4X = 400: Z5X = -300*(C4X=0):
Z6X = -500*(P2X=0)
3050 PRINT USING F$; Z1X;:PRINT,: PRINT USING F1$; Z4X:
PRINT "Safe Trip",: PRINT USING F$; Z2X;:PRINT,:
PRINT USING F1$; Z5X: PRINT "Shut Out",:
PRINT USING F$; Z3X;:PRINT,: PRINT USING F1$; Z6X:
09X = 09X+Z1X+Z2X+Z3X:
A9X = A9X+Z4X+Z5X+Z6X
3060 PRINT "Current Total",: PRINT USING F$; 09X;:PRINT,:
PRINT USING F1$; A9X:
IF (09X>=5000 OR A9X>=5000) AND 09X<>A9X THEN 9900 ELSE
LINE INPUT T$: GOTO 1000
4000 LINE INPUT V$: V$ = LEFT$(V$, 1): RETURN
5000 PRINT: PRINT: PRINT " Player Status Computer Status Player's Hand"
5010 PRINT A$(P0X) " A$(D1X) " A$(PZ(1)) " (1)":
PRINT A$(16+(R1X<0)) " A$(16+(D2X<0)) " A$(PZ(2)) " (2)":
PRINT USING "##### "; P2X;:
PRINT USING "##### "; C3Z;:
PRINT A$(PZ(3)) " (3)"
5020 SX(1)=1: SX(2)=1: SX(3)=1: SX(4)=1
5025 IF P5X=4 OR C6X=4 THEN ZX=4 ELSE ZX=0
5030 FOR Z1X = 1 TO 3-(ZX>3): TX = 1:
IF (P6X AND SX(1)) THEN PRINT A$(14) " "; SX(1) = 0: TX = 0
5040 IF (P7X AND SX(2) AND TX) THEN PRINT A$(11) " ";
SX(2) = 0: TX = 0
5050 IF (P8X AND SX(3) AND TX) THEN PRINT A$(19) " ";
SX(3) = 0: TX = 0
5060 IF (P9X AND SX(4) AND TX) THEN PRINT A$(8) " ";
SX(4) = 0: TX = 0
5070 PRINT SPACE$(TX*17); TX = 1:
IF (C7X AND SX(1)) THEN PRINT A$(14) " ";
SX(1) = 0: TX = 0

```



```

5080 IF (C8X AND SX(2) AND TX) THEN PRINT A$(11) " ";
SX(2) = 0: TX = 0
5090 IF (C9X AND SX(3) AND TX) THEN PRINT A$(19) " ";
SX(3) = 0: TX = 0
5100 IF (C0X AND SX(4) AND TX) THEN PRINT A$(8) " ";
SX(4) = 0: TX = 0
5110 PRINT SPACE$(TX*17);
IF Z1X<4 THEN PRINT A$(PZ(3+Z1X)) " (":
PRINT USING "##"; 3+Z1X;: PRINT ")": ELSE PRINT
5120 NEXT Z1X: PRINT: RETURN
9900 PRINT: PRINT:
IF 09X>A9X THEN PRINT "Congradulations - You Won." ELSE
PRINT "Better Luck Next Time - Computer Wins."
9910 PRINT: PRINT "I'm";
9999 END

```

#### COMPUTER HOBBYIST

Buy Supplies in Small Quantities at Low Prices . . . Diskettes, Cassettes, Ribbons & many more items. *Monthly Specials* . . . plus money saving *Tips & Ideas* sheet.

SEND FOR FREE MONTHLY COPY FROM  
Omnibus Data Supplies

3708 Davis Ave. • Cincinnati, OH 45211

CIRCLE 183 ON READER SERVICE CARD

**VisiCalc™**  
*How did you ever  
do without it?*

CIRCLE 167 ON READER SERVICE CARD



HOME

# POISON

CONTROL

Roger O. Litte, MD

**WARNING:** your home contains products which **MAY BE HARMFUL OR FATAL IF SWALLOWED.** This North Star BASIC program determines the necessary **EMERGENCY MEASURES** for ingestion of household products. Disk utility allows expansion of substance vocabulary to over 2400 names. Access time less than 6 seconds. Free annual updates. Complete Source listings.

Diskette and Manual . . . . \$28.00  
Manual only, with listings . . . .8.00

**WATCH FOR** cassette versions.  
Available at your computer store or from:

**Berkeley Medical Data Associates, Inc.**  
Microcomputer Consultants  
P.O. Box 5279, Berkeley, CA 94705  
(415) 653-6707

CIRCLE 144 ON READER SERVICE CARD



# Personal Electronic Transactions

**by Gregory Yob**

I am happy to hear from you, and encourage your correspondence. I will try to acknowledge all correspondence, and a SASE makes things easier for both of us. Please send your letters to "Personal Electronic Transactions" c/o PO Box 354, Palo Alto, CA 94301.



When I think about writing to the entire world of PET owners, I have a problem similar to one faced by William Shakespeare a long time ago. Some of you are peasants (i.e., beginners with computers and the PET), and some of you are noblemen (the PET might be your second or third personal computer, or you make a living programming). Old Will solved it by having both fast action scenes and rambling elegant soliloquys. My unoriginal method is to include both very technical and very simple material in each column. Since I am a nonconformist, I will start with the technical material this month.

## PET Input and Output

In 6502 based systems, all input and output is seen by the computer as memory locations. MOS technology provides several chips which are for I/O, and these chips have several memory locations reserved for I/O and the control of numerous options concerning I/O.

In the PET, two kinds of chips are used, two 6520's and one 6522. It isn't my intention to provide the specs for these chips here - contact MOS to get them. Figure 1 provides a table listing **all** the PET I/O lines and what they are assigned to. In most cases you can use the PEEK and POKE statements in PET BASIC to waggle these lines and see what they do - have fun!!!

## Tooting My Horn

(toot) I have been working on a comprehensive manual for the PET, called The PET Manual, which should be ready when this column reaches you. Feel free to send me inquiries, and mention that you heard about it here. (toot)

## More on PET Graphics

Here is some more info on using the PET in a graphical way. I must remind you that the program listings will follow the convention mentioned in the first column.

David J. Yob of Gallup, New Mexico (yes, he is a relative) tried out the PET false cursor program, and sent me this variation as an example of an irritating cursor: (I have to agree with him.)

```
10 PRINT"# 1ft";: FOR J=1 TO 50: NEXT
20 PRINT" 1ft": : FOR J=1 TO 50: NEXT(shift-apostrophe)
```

```
30 PRINT"$1ft";: FOR J = 1 TO 50: NEXT
40 PRINT"% 1ft";: FOR J = 1 TO 50: NEXT
50 GET A$: IF A$ = "" THEN 10 (" " is an empty string)
60 PRINT A$: : GOTO 10
```

Try it out!! If you use the screen editor, and move the cursor back into the line you just entered, change it and press RETURN again, entering this program isn't too tedious. Now try the following set of characters - you might like it (I get a "hurry it up!" feeling with this one.)  
Line 10: N Line 20: A Line 30: M Line 40: ]

I had never thought of animating the cursor, and wrote the following program to experiment with various combinations - note that this program lets you enter any set of characters and will put them up as the cursor one by one. (This is one of the neat things about programming - you can make a specific idea more general.)

```

10 INPUT "CURSOR STRING: "; C$
20 FOR C = 1 TO LEN (C$)
30 FOR J = 1 TO 50: NEXT
40 PRINT MID$(C$,C,1) "1 ft"; : NEXT C
50 GET A$: IF A$ = "" THEN 20
60 IF A$ = "X" THEN 10
70 PRINT A$: : GOTO 20

```

Line 10 lets you enter a string which holds the characters you want to try out for the cursor. Lines 20 to 40 take each character in the string and displays it on the screen for a while. Lines 50 to 70 check for your keypress and echo it on the display. If you type in "X," you can start again with a new string. A variety of nice effects can be generated, with a few shown below :

1) #EDCAFR\$ Note: SPACE will be show as "sp"  
 2) #\$ERDFCA  
 3) 'YHJBGT%%TGBJHY'  
 4) QQQQWWW  
 5) + + + \*\*\* Note no shift here.  
 6) + + + + + + + + + + + + + + + +  
 + + \*\* + + \* + + + \* This one got rhythm.

## Higher Resolution Graphs

Many of you have, no doubt, tried some of the simpler methods of drawing graphs on your PET - here is an example of what I mean :







Line 70 checks for going off the top or bottom of the screen. If so, the plot is skipped for this value of X.

Line 75 moves the cursor to the bottom left corner of the screen.

Line 80 (and Line 95 later) checks to see if X (or V) is less than 1. If this step is forgotten, the PET will deliver a nasty ILLEGAL QUANTITY ERROR - unfortunately, if a string function is told to return zero characters, instead of nicely giving a null string back, the PET growls!

Line 90 is our familiar "find the character" calculation.

Line 97 moves the cursor up, line 100 prints the character for plotting.

Line 120 waits for your appreciation of the plot.

Those of you with a bent for computation will object that this could have been done better by moving down (25-Y) times, over X times, and then plotting the (8-D)th character in P\$. Fine, go do it. I admit that this approach is faster, takes less space, etc. However, it is harder to understand, and I reserve the right to program my personal computer as I see fit!

In fact, I will often deliberately write somewhat crude code to preserve the clarity of the original idea that is being presented. I can't help but notice that programming is a funny art, and almost always the "best" way to do something is to do it backwards and inside out!

This plot can now be made into a bar graph by changing U\$ to a sort of "totem pole," i.e., a set of:

rvs sp lft up (at least 25 of these)

and changing P\$ to the Vertical Bars set (starting with off \$), and then changing the expressions for D and the printing of the character in the same way that the older bar graph was made.

I leave this conversation as a challenge to you with two warnings: 1) When printing U\$ the last time, the cursor may move off the right edge of the screen - watch out for this. 2) Don't try printing U\$ with an expression like: LEFT\$(U\$,V/4) - this will print U\$ in chunks of one character, and you want chunks of four characters. (If you goof this, it's an enjoyable and very mystifying bug!) Also, remember what happens if you feed a string expression something that turns out to be zero.

The Double Density characters permit a 80 x 50 display. Since the PET has a screen and you can move the cursor around as you will, it is easy to plot functions that move backwards or up - a task that was very difficult with a printer type terminal.

There is one problem with Double Density - what happens if you want to plot near another point? It is important to somehow know that you were nearby earlier so you won't destroy the work already done. There are two ways to do this. The first is to store the previously plotted pairs of points somewhere, and look through them all to find any "collisions." This takes lots of memory and even more time. The other way is to note that the PET display is actually a part of main memory, and can be changed directly without using PRINT at all.

The PET picture starts at location 32768 and goes up to 33768. To write on the display, you use the POKE statement. To look at the display, you use the PEEK function. Try these experiments:

- 1) In direct mode, enter the line below and press RETURN  
?"clr": POKE 33333,1
- 2) After doing 1), enter & press RETURN:  
?PEEK(33333), PEEK(33330)

The first experiment leaves you with the letter A about halfway down the screen. The second one will leave you the two numbers 1 and 32 respectively. A bit of thought reveals that location 33333 has the value 1 when PEEKed, and shows the letter A. Location 33330 is blank and has the value of 32.

To see all the codes used by the screen, try:

?"clr dn dn dn dn dn dn dn dn dn dn": FOR J = 1 TO 255:  
POKE 32768 + J,J: NEXT

(This will run off the edge - don't worry, the PET accepts up to two lines on the screen as a direct command.) All 256 possible characters will appear, 128 in normal field, and 128 in reverse field.

One way to get the code for a particular character is to home the cursor, print the character, move the cursor somewhere else, and use

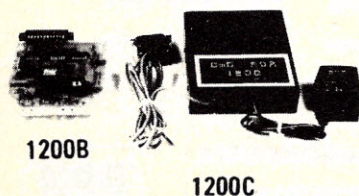
?PEEK(32768)

The codes for the Double Density set are shown in Figure 2.

Now we are able to tackle the problem of doing a Double Density plotting program for the PET. The first decision is to define where the origin is (where X = 0 and Y = 0). Doing things backwards, the "home" position (upper left corner) is chosen. Then the directions for X and Y are found to be: X increases to the right, and Y increases going down. This lets us use a simple formula for getting the address in memory for an X,Y location. If we were doing a single density plot, the formula would be:

# PET PRINTER ADAPTER

GET HARD COPY FROM YOUR  
COMMODORE PET USING A  
STANDARD RS-232 PRINTER



The CmC ADA 1200 drives an RS-232 printer from the PET IEEE-488 bus. Now, the PET owner can obtain hard copy listings and can type letters, manuscripts, mailing labels, tables of data, pictures, invoices, graphs, checks, needle-point patterns, etc., using an RS-232 standard printer or terminal.

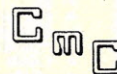
**\$98.50** ADA 1200B  
Assembled and tested

**\$169.00** ADA 1200C  
With case, power supply  
and RS-232 connector



Order direct or contact your local computer store.  
Add \$3.00 for postage and handling per order.

CONNECTICUT microCOMPUTER  
150 POCONO RD. BROOKFIELD, CT 06804  
(203) 775-9659





Address = 32768 + 40\*Y + X

For Double Density, it becomes:

Address = 32768 + 40\*INT(Y/2) + INT(X/2)

Plotting on the screen now consists of these steps:

Step 1 Calculate the address and PEEK the screen memory to get anything that is already there.

Step 2 Find out where the dot is to be placed in the 2x2 grid, and somehow combine this with what we found on the screen.

Step 3 POKE the new character on the screen at the address calculated in Step 1.

Step 2 is the most complicated of these, and I must warn the beginners that perhaps you should skip this part and go on to the fun stuff - using this routine to make nice pictures.

If you look again at Figure 2, you will see a 2x2 box with the small squares numbered from 0 to 3. The table beneath the box shows the Double Density characters arranged so that if a small square is full for a character, the corresponding bit of the numbers 0 to 15 is a 1. I chose this arrangement so you could "cut" the 2x2 grid and lay the top to the right side to make the 1 x 4 binary grid - this was the easiest way to translate from the characters to the numbers 0 to 15.

When a point is to be plotted, the screen is PEEKed, and the table searched to find the correct character, and the character's number (0 - 15) is saved. Next, the X and Y values are checked to find out which corner has the dot in it. To combine the two values is easy (but a sneaky trick!) - just OR together the character from the screen and the character with the dot in the corner. This is done by ORing the table value for the screen character and the table value for the dot-in-the-corner character. (To be technical, the indices of the two characters are Ored to get the index of the character to POKE.) The new value is used to find the character in the table to POKE to the screen.

The little table on the right side has the OR and AND values for the four possible even/odd combinations of X and Y. If you wanted to plot in black, you would AND with the AND value instead of ORing.

Here is the Double Density Plotting routine - if you enter this and SAVE it on tape, it can be handy for many programs.

```
1000 REM DOUBLE DENSITY PLOT
1010 REM GIVEN X,Y,Z PLOT IN 80 X 50
1020 REM GRID WITH 0,0 AT HOME
1030 REM Z = 0 BLACK, Z = 1 WHITE
```

```
1040 REM CALL SUB 1500 BEFORE USING
1045 REM FIRST TIME.
1050 REM FIND WHAT'S ON SCREEN
1060 AD = 32768 + 40*INT(Y/2) + INT(X/2)
1070 DD = PEEK(AD)
1080 REM SEARCH TABLE FOR BIT PATTERN
1090 FOR PT = 0 TO 15
1110 IF DD = PX(PT) THEN 1150
1120 REM DON'T PLOT IF NOT FOUND
1130 NEXT PT: RETURN
1140 REM CALC OR/AND CODE
1150 EX = X-2*INT(X/2); EY = Y-2*INT(Y/2)
1160 ON EX + 2*EY + 1 GOTO 1170,1180,1190,1200
1170 CO = 2: CA = 13: GOTO 1220(CO is the two letters C &
1180 CO = 1: CA = 14: GOTO 1220 O)
1190 CO = 8: CA = 7: GOTO 1220
1200 CO = 4: CA = 11
1210 REM MODIFY ACCORDING TO COLOR Z
1220 IF Z = 1 THEN PK = CO OR PT (white)
1230 IF Z = 0 THEN PK = CA AND PT (black)
1240 REM PUT ON SCREEN
1250 POKE AD, PX(PK)
1260 RETURN
1500 REM DD PLOT INITIALIZE
1510 DIM PX(15)
1520 FOR J = 0 TO 15: READ PX(J): NEXT
1530 DATA 32, 124, 126, 226, 108, 225, 127
1540 DATA 251, 123, 255, 97, 236, 98, 254
1550 DATA 252, 160
1560 RETURN
```

Subroutine 1500 reads the character set into the table for use by Subroutine 1000.

Line 1060 computes the address for PEEK and POKE on the screen from X and Y. Line 1070 fetches the screen value as DD.

Lines 1090 to 1130 look through the table to find the corresponding character. The value PT is the indice to be ANDed or Ored later. If the character can't be found, the plot is suspended - this is a nice way of not overplotting any printing, axis, etc., that you might want on your plot.

Line 1150 sets EX to 1 if the X is odd, and EY to 1 if Y is odd.

Line 1160 selects one of four OR/AND values from EX and EY. The one must be added because PET ON - GOTO will jump only if the ON value is one or more. Lines 1170 to 1200 set the OR and AND values.

Lines 1220 and 1230 select the new indice depending on the "color," 1 for white, and 0 for black.

CmC

# PET ANALOG INPUT

DAM SYSTEMS

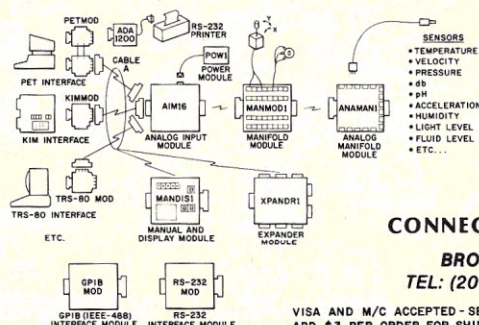
Analog to Digital Conversion System for the Commodore PET Computer

Give the PET the ability to sense, measure, and control the world around it with DAM SYSTEMS modules. Just plug the PETSET1 into the PET to set 16 channels of analog input. Screw terminals are provided for each channel so you can hook up Joysticks, pots, or whatever appropriate sensors you have.

Each of the 16 analog inputs, in the range of 0 to 5.12 volts, is converted to a decimal number between 0 and 255 (20 millivolts per count). Conversion time is 100 microseconds.

In addition, the PETMOD provides two IEEE ports and one user port as well as a DAM SYSTEMS port.

Software is provided. A one line program is all that is necessary to read a channel.



- PETSET1**
- 1- AIM161 - 16 ANALOG INPUTS - 8 BITS - 100 MICROSEC
  - 1- PETMOD - PET ADAPTER - 2 IEEE PORTS - 1 USER PORT - 1 DAM SYSTEMS PORT
  - 1- CABLE A24 - 24 INCH INTERCONNECT CABLE
  - 1- MANMOD1 - MANIFOLD MODULE - SCREW TERMINALS FOR INPUTS, REFERENCE, GROUND
  - 1- POW1 - POWER MODULE

PETSET1a for 110 VAC \$295  
PETSET1e for 230 VAC \$305  
Order direct or contact your local computer store.

**CONNECTICUT microCOMPUTER, Inc.**  
150 POCONO ROAD  
BROOKFIELD, CONNECTICUT 06804  
TEL: (203) 775-9659 TWX: 710-456-0052

VISA AND M/C ACCEPTED - SEND ACCOUNT NUMBER, EXPIRATION DATE AND SIGN ORDER.  
ADD \$3 PER ORDER FOR SHIPPING & HANDLING - FOREIGN ORDERS ADD 10% FOR AIR POSTAGE.



Line 1250 POKes the new character on the screen. Note that PK points to the character in array PX. Now, let's use our plotter for some fun! LOAD your double density subroutine and add the following code:

```
10 PRINT "clr"; Z = 1: GOSUB 1500
15 PRINT "RAD,AMP,FREQ"
20 INPUT R,A,F
30 FOR AN = 0 TO 2*pi STEP pi/50 (pi is the key above)
40 RA = R + A*SIN(F*AN) RETURN, shifted)
50 X = RA*COS(AN): Y = RA*SIN(AN)
60 X = INT(X+.5) + 45: Y = INT(Y+.5) + 25
70 GOSUB 1000: NEXT AN
80 END
```

Line 10 gets everything ready to go. Lines 15 and 20 let you enter some parameters which I won't explain - try the examples below and see what they do. Lines 30 to 50 compute the X and Y for a polar plotting function. (Sorry, I don't have enough space to explain this one better.) Lines 60 and 70 move the origin of the figure to the center/right of the screen and call the plotting routine.

Here are some values to try:

- 1) 0,20,2
- 2) 0,25,3
- 3) 12,12,5
- 4) 20,5,10
- 5) 20,0,0

If you want to do more than one at a time, make Line 80:

```
80 PRINT "hm"; GOTO 15
```

(Phew! - enough!!) This has been a long column to wade through. Happy plotting! □

I am happy to hear from you, and encourage your correspondence. I will try to acknowledge all correspondence, and a SASE makes things easier for both of us. Please send your letters to "Personal Electronic Transactions" c/o PO Box 354, Palo Alto, CA 94301.

#### PET Input/Output Lines — FIGURE 1

These tables relate the PET I/O lines to the internal PIA's and the VIA. See the 6522 and 6420 documents for how to control these lines.

##### KEYBOARD PIA (6520)

PA0 Keyboard column select  
PA1 Keyboard Column select  
PA2 Keyboard column select  
PA3 Keyboard column select  
PA4 Switch, Cassette #1  
PA5 Switch, Cassette #2  
PA6 EOI In  
PA7 Diagnostic Jumper

CA1 Read, Cassette #1  
CB1 Blank Screen and EOI out

Address: E810 59408

PB0 Keyboard row  
PB1 Keyboard row  
PB2 Keyboard row  
PB3 Keyboard row  
PB4 Keyboard row  
PB5 Keyboard row  
PB6 Keyboard row  
PB7 Keyboard row

CB1 Video Sync in  
CB2 Motor, Cassette #1

##### IEEE-488 PIA (6520)

PA0 IEEE Data In - 1  
PA1 IEEE Data In - 2  
PA2 IEEE Data In - 3  
PA3 IEEE Data In - 4  
PA4 IEEE Data In - 5  
PA5 IEEE Data In - 6  
PA6 IEEE Data In - 7  
PA7 IEEE Data In - 8

CA1 ATN in  
CA2 NDAC out

Address: E820 59424

PB0 IEEE Data Out - 1  
PB1 IEEE Data Out - 2  
PB2 IEEE Data Out - 3  
PB3 IEEE Data Out - 4  
PB4 IEEE Data Out - 5  
PB5 IEEE Data Out - 6  
PB6 IEEE Data Out - 7  
PB7 IEEE Data Out - 8

CB1 SRQ in (not buffered)  
CB2 DAV out

Note: All IEEE related lines are buffered except for SRQ in. This includes the lines in the VIA. CB1 of the keyboard PIA both blanks the screen and pulls EOI out low.

##### USER PORT VIA (6522)

PA0 Lsb of User Port  
PA1 User Port  
PA2 User Port  
PA3 User Port  
PA4 User Port  
PA5 User Port  
PA6 User Port  
PA7 Msb of User Port

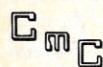
CA1 User Port handshake  
CA2 Character set select (Graphics vs U/L case)

Address: E840 59456

PB0 NDAC in  
PB1 NRFD out  
PB2 ATN out  
PB3 Write (Both cassettes)  
PB4 Motor, Cassette #2  
PB5 Video Sync in  
PB6 NRFD in  
PB7 DAV in

Note: The Diagnostic LED will light if the Keyboard PIA is as follows: PA0 High, PA1 High, PA2 Low, PA3 High, Others Don't Care

PS: It isn't clear whether the IEEE control lines should have the bar (to indicate low true) on top or not. Try it yourself and see.



## KIM ANALOG INPUT

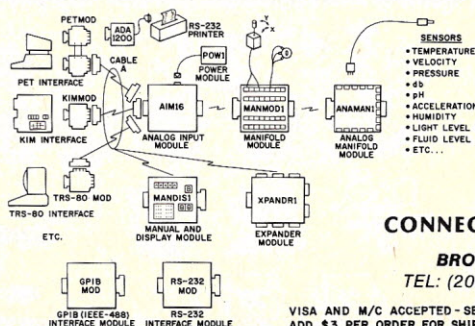
### Analog to Digital Conversion System for the KIM Computer



Give the KIM the ability to sense, measure, and control the world around it with DAM SYSTEMS modules. Just plug the KIMSET1 into the KIM to set 16 channels of analog input. Screw terminals are provided for each channel so you can hook up joysticks, pots, or whatever appropriate sensors you have.

Each of the 16 analog inputs, in the range of 0 to 5.12 volts, is converted to a decimal number between 0 and 255 (20 millivolts per count). Conversion time is 100 microseconds.

The KIMMOD provides one user port as well as a DAM SYSTEMS port. Software is provided.



#### KIMSET 1

- 1-AIM161 - 16 ANALOG INPUTS - 8 BITS - 100 MICROSEC
  - 1-KIMMOD - KIM ADAPTER - 1 USER PORT - 1 DAM SYSTEMS PORT
  - 1-CABLE A24 - 24 INCH INTERCONNECT CABLE
  - 1-MANMOD1 - MANIFOLD MODULE - SCREW TERMINALS FOR INPUTS, REFERENCE, GROUND
  - 1-POW1 - POWER MODULE
- KIMSET1a for 110 VAC \$ 285  
KIMSET1e for 230 VAC \$ 295

Order direct or contact your local computer store.

**CONNECTICUT microCOMPUTER, Inc.**  
150 POCONO ROAD  
BROOKFIELD, CONNECTICUT 06804  
TEL: (203) 775-9659 TWX: 710-456-0052

VISA AND M/C ACCEPTED - SEND ACCOUNT NUMBER, EXPIRATION DATE AND SIGN ORDER.  
ADD \$3 PER ORDER FOR SHIPPING & HANDLING - FOREIGN ORDERS ADD 10% FOR AIR POSTAGE



FIGURE 2  
DOUBLE DENSITY CHARACTER SET TABLE  
AND  
OR/AND CHARACTERS

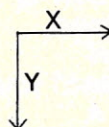
|   |   |
|---|---|
| 1 | 0 |
| 3 | 2 |

# DOTS vs BITS

| CHAR # | 3 | 2 | 1 | 0 |
|--------|---|---|---|---|
| 0      | 0 | 0 | 0 | 0 |
| 1      | 0 | 0 | 0 | 1 |
| 2      | 0 | 0 | 1 | 0 |
| 3      | 0 | 0 | 1 | 1 |
| 4      | 0 | 1 | 0 | 0 |
| 5      | 0 | 1 | 0 | 1 |
| 6      | 0 | 1 | 1 | 0 |
| 7      | 0 | 1 | 1 | 1 |
| 8      | 1 | 0 | 0 | 0 |
| 9      | 1 | 0 | 0 | 1 |
| 10     | 1 | 0 | 1 | 0 |
| 11     | 1 | 0 | 1 | 1 |
| 12     | 1 | 1 | 0 | 0 |
| 13     | 1 | 1 | 0 | 1 |
| 14     | 1 | 1 | 1 | 0 |
| 15     | 1 | 1 | 1 | 1 |



| POKE | CHAR   |
|------|--------|
| 32   | off sp |
| 124  | off    |
| 126  | off    |
| 226  | rvs "  |
| 108  | off ,  |
| 225  | rvs !  |
| 127  | off ?  |
| 251  | rvs ;  |
| 123  | off ;  |
| 255  | rvs ?  |
| 97   | off !  |
| 236  | rvs ,  |
| 98   | off "  |
| 254  | rvs    |
| 252  | rvs    |
| 160  | rvs sp |



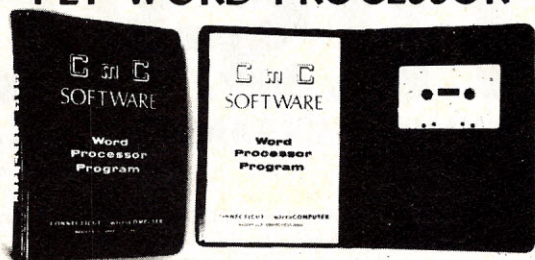
| X | Y |
|---|---|
| E | E |
| E | O |
| O | E |
| O | O |

E = EVEN  
O = ODD



| CHAR # | TO | AND |
|--------|----|-----|
| 2      | 13 |     |
| 1      | 14 |     |
| 8      | 7  |     |
| 4      | 11 |     |

## PET WORD PROCESSOR



This program permits composing and printing letters, flyers, advertisements, manuscripts, etc., using the COMMODORE PET and a printer.

Script directives include line length, left margin, centering, and skip. Edit commands allow the user to insert lines, delete lines, move lines and paragraphs, change strings, save onto cassette, load from cassette, move up, move down, print and type.

The CmC Word Processor Program addresses an RS-232 printer through a CmC printer adapter.

The CmC Word Processor program is available for \$29.50. Add \$1.00 for postage and handling per order.

Order direct or contact your local computer store.



**CmC**  
CONNECTICUT microCOMPUTER  
150 POCONO ROAD  
BROOKFIELD, CONNECTICUT 06804  
(203) 775-9659



for PET, TRS-80, Compucolor



New Soundware system makes music and sound effects! Complete system includes volume control, earphone jack, connectors, DEMO PROGRAM, instructions and a SOUND COMPOSER to experiment with and create your own sound effects without having to understand BASIC! Just plug in and use! Unit comes with a 1 year warranty. \$29.95 for PET & TRS-80, \$39.95 for Compucolor (includes diskette)  
prices subject to change without notice

## PLUS! SOUNDWARE SOFTWARE™

for 8K PET compatible with all CB-2 sound devices

Features: • Sound (of course) • Super Graphics • Instruction Booklet • 90 Day Warranty

### 1. THE ACTION PACK

—Breakout (8 versions)/Target/Caterpillar

### 2. THE CLASSICS

—Checkers (8 versions)/Backgammon/Piano Player

### 3. WORD FUN

—Speller (4 versions)/Scramble/Flashcard

\$9.95 per pack or 3 packs plus bonus program for \$29.00  
More sound programs coming: TRS-80 and Compucolor too!

To Order:  
By Phone: (408) 371-4120  
Send to:  
CAP Electronics  
1884 Shulman Ave.  
San Jose, CA 95124

VISA/Mastercharge  
Accepted  
Shipping: no charge  
when payment encl.  
Add 15% for C.O.D.  
CA residents add 6% tax  
DEALER & DISTRIBUTOR INQUIRIES WELCOME



# ATTENTION TRS-80'S

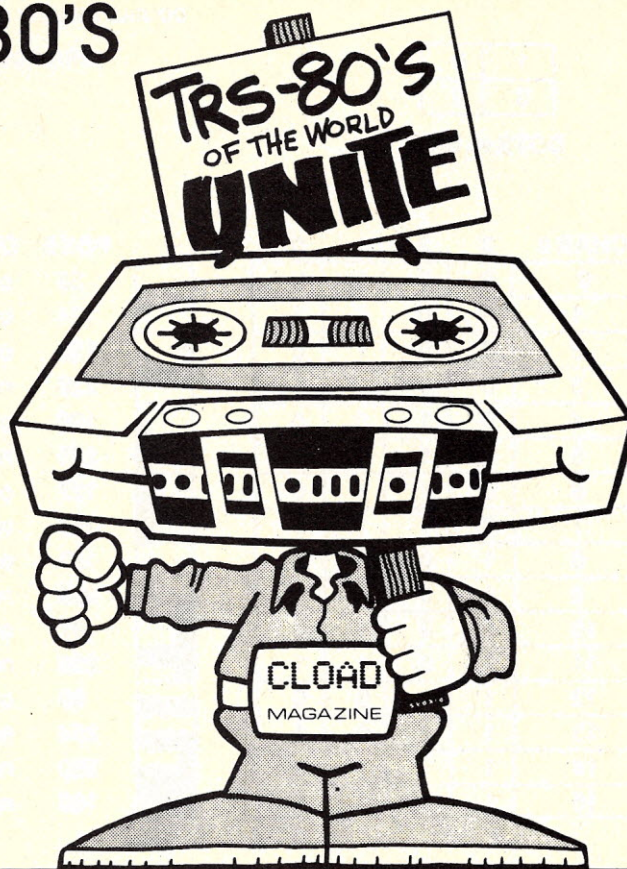
Why sit in the corner in the dark and turned off while your master is sitting by the light, turned on to Creative Computing Magazine? You need a magazine of your own for Education-Enlightenment-Enjoyment and for the personal satisfaction (you're a personal computer, aren't you?) of your very own possession. . . A Subscription to **CLOAD MAGAZINE!** Turkey your master into sending a \$36.00 check to the jive cats at **CLOAD MAGAZINE.** You will get 12 C-30 cassettes, one a month, each one filled with all kinds of juicy software - Games, Tutorials, Practical Programs and Impractical Trivia. All programs rated G for computers under 18 years old.

Do It! Subscribe Now!

**CLOAD**

**MAGAZINE**

Box 1267  
Goleta, CA 93017  
(805) 964-2761  
MasterCharge/VISA  
welcome



CIRCLE 134 ON READER SERVICE CARD

©1978 CLOAD MAGAZINE

**practical  
applications**

**MAIL-  
LIST**

## 1300 NAMES PER DISK! REAL POWER FOR THE TRS-80!

Don't settle for expensive mailing list programs that limit you to as little as 500 or 600 names and addresses. Our dynamic formatting allows up to 1300 names and addresses per 5 1/4" diskette, as many extra lines per address as you need! Zip and Alpha sorts, 26 select codes! Room for the new zipcode scheme being considered by the Post Office! Special one-line list mode for editing ease, full screen recall. All the mailing list you need. Requires two-drive system; with documentation. **\$49.95**

**PRACTICAL APPLICATIONS™**

Post Office Box 4139

Foster City, CA 94404

(415) 573-8217

- ☐ Please send TRS-80 MAIL-LIST. \$49.95 (Calif. add tax) is enclosed.  
☐ Send your catalogs.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

TRS-80 is a trademark of Tandy Corp.

CC579

CIRCLE 187 ON READER SERVICE CARD

# TRS-80

## MEMORY EXPANSION KITS \$79

Each Kit consists of: 8 Memory Chips, Jumper Blocks, and Complete EASY TO FOLLOW Instructions

Expands 4K TRS-80 up to 48K (3 sets)

TRS-80FLOPPY Disk (SA-400) Add On

COMPLETE Ready to use with power supply and case **\$389**

**ADD to your APPLE or \$100 Bus Computer**

\$89 - Set of 8 250 NS

\$99 - Set of 8 200 NS

No. 4116 - 200 NS (w/16K Chips), 16K, \$279, 32K, \$375, 48K, \$469, 64K, 568

No. 4115, 8K, \$189, 16K, \$229, 24K, \$269, 32K, \$309

## \$100 Bus Expandoram Kits\*

\*Expand NOW or LATER to 64K (32K for \*K Chips)

8K Chips: \$49/Set of 8

ASSEMBLED, TESTED AND BURNED IN - ADD \$50

MONEY BACK GUARANTEE

FULLY WARRANTED FOR 6 MONTHS

Master Charge - VISA - C.O.D. (25% with order) -

Money Order - California Residents add 6% Sales Tax

Shipping Charges: \$2.00



**MicroComputerWorld**



P.O. Box 242

San Dimas, CA 91773

(213) 286-2661

CIRCLE 195 ON READER SERVICE CARD

CREATIVE COMPUTING



# TRS-80 Strings

Stephen B. Gray



In this sixth TRS-80 column, we'll be looking at the details surrounding the demise of the DUMP record; a Radio Shack game program; a newsletter that carries many ads for TRS-80 items; program lines that let you avoid changing PRINT to LPRINT; two free modifications Radio Shack will make to your TRS-80, if required; a Computer Doodler program; and, the "TRS-80 Micro Computer Technical Reference Handbook."

We welcome information from new manufacturers of TRS-80 hardware and software about their products. Please write to me in care of *Creative Computing*.

**DUMP Dumped.** Once upon a time, and not all that long ago, a Florida company called Micro Systems Services advertised a Dial-a-Program service with an 800 number. They were going to transmit programs for the TRS-80 over phone lines, and you would use an ordinary telephone pickup connected to an audio cassette recorder to tape the programs. But the programs couldn't be transmitted reliably, so the service was discontinued.

Undiscouraged, the company changed its name to DUMP Publications, and sent out sample copies of DUMP, a monthly TRS-80 software magazine on a 33 $\frac{1}{3}$  rpm flexible plastic record. It was similar to what you may have seen in another computer magazine, and designed to be played on an ordinary phonograph. You were supposed to pick off the

signal at the speaker leads, and run it into your cassette recorder. A one-year subscription was \$20. New product announcements for DUMP appeared in several publications, including *Creative* (Nov/Dec 1978, p. 17).

The first issue of DUMP was dated August 1978. But apparently too many people had problems with the disk-to-tape transfer. There was no second issue of DUMP; the toll-free 800 number of DUMP Publications was discontinued; and, soon after the alternate number, given by the 800 operator, was also discontinued.

Several months later, a note went out to DUMP subscribers, to the effect that "due to our vendor's inability to provide us with the quality and time frame we demand, DUMP, in its present form, will no longer be offered to new subscribers. To fill our commitment to our existing subscribers, DUMP is providing a package of more complex software. This package will include the following: Accts/Rcvbl/Payable, Cash Register.... Thank you for your patience."

**Quick, Watson!** This \$4.95 Radio Shack game of logical deduction involves eight men suspected of four crimes committed during "the great train robbery."

You're asked to figure out, on the basis of lie-detector results, which suspect committed each of the four crimes—and a suspect could have committed more than one crime, just to complicate things. In each of the

eight tries you get, you name a suspect under one of the four crimes listed, and the lie detector lets you know how many of the four suspects are guilty as charged, and how many are guilty but charged with the wrong crime. "It does not tell you which one(s) of your selections is correct," as the brief manual says. All you've got to go on is a total of zero to four dots under the lie-detector results of "pegged" (guilty as charged) and "wrong crime."

The game can be played in either Level-I or Level-II, and of course the guilty parties are randomly selected anew for each game. Sometimes it's fairly easy to win, sometimes not. You may find this game quite a challenge. Since the program keeps track of your average number of tries, you could play against one or more other people, to find out who is fastest at picking the guilty four, or three, or two, or even one. Warning: this game can be addictive; you may find yourself playing "just one more" for quite a long time.

**ON\_\_LINE.** An advertising newsletter that publisher Dave Beetle calls the "Buy & Sell Forum for the Computer Hobbyist," ON\_\_LINE (24695 Santa Cruz Hwy, Los Gatos, CA 95030) is printed every three weeks, is "free at participating stores," and otherwise costs \$4.65 for 18 issues (\$12.50 airmail), \$8.80 for 36 issues (\$23 airmail).

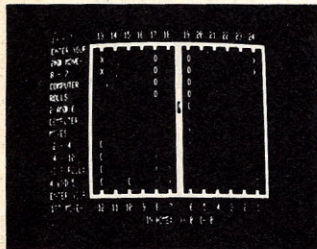
Among several hundred brief ads for everything from programming forms to line-surge protectors, ON\_\_



Improve Your Game With

## >>> FASTGAMMON >>>

An Exciting New Backgammon Opponent!



>>> FASTGAMMON >>> ON THE TRS-80

Ready to run on your

- TRS-80 (level II)
- APPLE II
- SOL
- POLY-88
- COMPAL-80

All versions require at least 16K. Apple disk requires 24K. Poly-88 and Sol not available on disk.

**OUTSTANDING FEATURES!** — Computer makes good moves instantaneously. Literal and graphic displays of each move. Option to replay same rolls. Eight-page instruction manual.

**OUTSTANDING VALUES!** — Only \$20 on cassette or \$25 on diskette. California residents add 6% sales tax.

AVAILABLE AT COMPUTER STORES EVERYWHERE

OR ORDER DIRECT FROM



**Quality Software**

10051 Odessa Avenue  
Sepulveda, CA. 91343

CIRCLE 135 ON READER SERVICE CARD

## MICROPOLIS

The Mailing Label Program is an application program for the Micropolis Metafloppy Disk Systems. In addition to the address, you may enter a line of information and three variables that are user defined. The program can handle 1000 names per diskette. The output options allow for sorting by the last name or company name, zip code and a user defined variables.

In the ML version, the sort will take from 1 to 20 SECONDS, depending on the number of records being sorted. The BL version of the sort takes between 10 seconds and 15 minutes.

An extensive error handling routine assures practically error-free operation. All messages are documented in a 20 page user's guide.

ALSO AVAILABLE, a Machine Language Sort Utility. The utility is designed to be easily interfaced to YOUR BASIC programs. The sort is 100 times faster than the best written BASIC sort.

Available to be shipped immediately upon receipt of your order and payment (money order, cashier's check, Visa or Master Charge). A shipping charge of \$2.00 will be added to all orders. California residents, please add 6%.

**COMPLETE USERS MANUAL \$10.00**  
**MAILING LABEL (ML) 79.50**  
**MAILING LABEL (BL) 39.50**  
**MACH. SORT UTILITY 59.50**

**IN DEVELOPMENT:**  
**A RESTAURANT PAYROLL PACKAGE**



**COMPUTER SERVICES**  
P.O. BOX 15643  
San Diego, CA 92115  
(714) 438-9137

CIRCLE 132 ON READER SERVICE CARD

## TRS-80 Strings con't...

LINE always carries one or two dozen ads for TRS-80 items, such as memory kits, programs, disk drives, printers, user clubs, used systems; one ad even offers help with programming problems, apparently free.

If you don't have a computer, and can't afford a new one, this is a fine place to look for a used one, anywhere from a KIM-1 to a complete TRS-80 business system.

**PRINT on a Line Printer.** Suppose you've got a long Level-II program full of PRINT statements that you decide to output to a line printer. You can change the PRINTs to LPRINTs, or you can use POKes to force the computer to put on the printer what would otherwise go up on the screen, with:

POKE 16414,141

POKE 16415,5

To get out of this mode, use

POKE 16414,88

POKE 16415,4

**Cassette Load Mod.** For Level-II users who've been having problems with loading from cassette, Radio Shack has a hardware solution. If you've been having more than a little trouble with CLOAD, no matter what setting of the volume control you use, or how clean your cassette-unit heads are, take your keyboard unit to your local Radio Shack. The manager will send it to a repair center, where a LEVEL-II CASSETTE LOAD MODIFICATION will be installed, free of charge. Free, that is, if you haven't been playing with the insides of your CPU. If you have, you may get an estimate of what the charges will be.

The modification is an added two-inch-by-two-inch PC board, an automatic gain-control circuit that controls the read logic by overriding the volume control, which can be set anywhere between 3 and 8. The AGC will clip a strong signal and amplify a weak one.

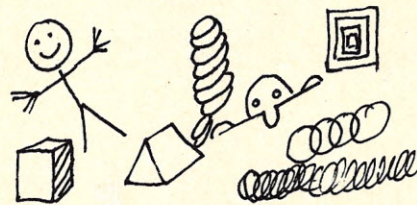
Level-II volume control adjustments are more sensitive and critical than for Level-I CPUs, which have a wider latitude. The problem seems to be caused mainly by the faster transfer rate, which makes for more critical timing.

**Active Cable.** For business-system users of 32K or 48K TRS-80s (or for hobbyists, if any have that much RAM) who have problems with bit dropout, Radio Shack has an engineering change called the ACTIVE CABLE, which replaces the existing cable.

The new cable "strengthens the memory address line from the CPU to the extended RAM in the expansion interface," according to Fort Worth

This amplifier is like a telephone repeater, consisting of a small PC board built into the cable itself, and acting like a buffer between the CPU and higher memory.

As with the Cassette Load mod, the Active Cable is available free of charge through the manager of your local Radio Shack. Again, no charge unless you've been "tampering," as Fort Worth puts it.



**Computer Doodler.** For \$5, Les Logan (436 Warner Cir., Norfolk, VA 23509) will send you his cassette of Computer Doodler, written in Level-I BASIC.

The cassette contains three programs. The first "will allow a user to quickly and easily create complex patterns (or simply doodle aimlessly) without prior programming knowledge," as the REM lines state. The commands are SET, RESET, UP, DOWN, LEFT, RIGHT, and ANGLE (or just their first letters).

Computer Doodler I guides you, by asking (at the top of the screen) where you want to start (how far from the left, 0 to 127; how far down, 6 to 47); SET or RESET mode; direction; and then tells you the maximum length of the line you can draw in that direction. Current location is always displayed, in XY coordinates, at the top of the screen.

If you choose ANGLE for direction, you're asked if the line is to go up or down, left or right, and how far. An ANGLE line consists of a diagonal made up of what looks like squares, but actually consists of pairs of graphics blocks. The angle is not 45 degrees, but more like 40.5 degrees (due to the 3:7 aspect ratio of the graphics blocks); this is the only angle the Doodler can draw.

Computer Doodler II is almost the same as I, but it stores the command steps in memory, and has three modes of operation: doodle into memory; replay doodle from memory; display commands that are in memory.

Computer Doodler III is the same as II except that commands are recorded on cassette tape instead of internal memory, one at a time. On playback, the tape reads out the data for a line, the line is drawn while the tape is halted, and the coordinates



and step number are displayed at the top of the screen.

Despite its simplicity, Computer Doodler can save a great deal of time in drawing just about anything, as long as it doesn't require lines at angles other than 40.5 degrees.

**Technical Manual.** That's the title in Radio Shack's latest TRS-80 hardware catalog, but the actual title of this \$9.95 manual is "TRS-80 Micro Computer Technical Reference Handbook."

As the preface to this 108-page handbook puts it, "This Book was written for the technical person, by a technical person. It was not written to educate the average owner of a TRS-80 Micro-Computer. If you do not know what Hex means...or how a NOR gate differs from a NAND gate...you are not prepared to repair your Computer. (You need some solid digital logic training; and this Book won't give it to you.)"

The preface also notes that "if you are a hobbyist who can convert Hex to Decimal in the blink of an eye and you've entered 16K BASIC languages using front panel switches, then this book will probably appear longer than it needs to be." Although the book is intended for TRS-80 owners who may wish to repair their computers, the

preface ends with the warning, "We'd like you to remember that any work you do on your TRS-80 'voids the warranty.' And, we will not obligate ourselves to repair or correct owner modifications."

After a system block diagram (with explanation) and a Level-I memory map, the handbook gets into the meat, 41 pages on Theory of Operation, describing in detail the two fold-out schematics at the back of the book. The preface isn't kidding: to follow the text you've got to be able to understand phrases such as "Note that R58 keeps this line pulled high" and "MUX then changes states." This last refers to one of the waveform charts, of which there are half a dozen in the theory section.

The 26 pages on Adjustments and Troubleshooting tell how to take apart the computer, check and adjust the power supply, how to isolate the problem using two troubleshooting flowcharts, and then go into detail on the more common problems and what to do about them. Such as bouncy keys, a blank screen, relay damage ("particularly susceptible in Level-II units"), open feedthroughs, static outputs, etc.

The Outside World chapter provides 10 pages on the technical side

of memory-mapped and port-based external devices, and an explanation of expansion-port signals.

The handbook finishes with a Parts List and the schematics, plus a lengthy explanation that because different BASIC ROMs were used, there were three major printed-circuit board changes. First Intel 2616 EP ROMs, then National MM2316 ROMs, followed by Motorola 7800-series ROMs (first the two-chip set, then the single-chip set).

Here then is just about everything most technically-minded TRS-80 owners will want to know about the innards of their machines. Software is not discussed in detail—that's the subject of other manuals.

I wish they'd put function identifiers on the components on the two main schematics, to help figure out what's going on where. Just a couple of words next to Z32 to say it's part of the video divider chain, for example. Yes, the text has a lengthy discussion and partial schematics of the chain, but a troubleshooter needs all the help he can get. And how about an index? There's no index in the Level-I or Level-II BASIC manuals, nor in this handbook. Otherwise it's the answer to the prayers of (most) TRS-80 hardware devotees. □

## The 8100 by HUH ELECTRONICS

An S-100 Bus Adapter/Motherboard for the TRS-80 plus a whole lot more!!!



- S-100 BUS INTERFACE
- 6 SLOT MOTHERBOARD

- SERIAL RS232/20ma I/O
- PARALLEL INPUT AND OUTPUT
- SPACE FOR 16K DYNAMIC RAM
- CAN USE LEFT OVER 4K CHIPS
- LOW COST—PRICES START AT \$185\*
- AVAILABLE IMMEDIATELY

The 8100 allows a Radio Shack TRS-80 computer to be interfaced to the popular S-100 Bus for memory expansion and extended I/O capabilities. For example, you can now easily add more memory, floppy disc systems, PROM boards, printer interfaces, multi-purpose I/O boards, AI device controllers, and a whole host of other varied peripherals.

The 8100 has its own built-in 6 slot motherboard which includes our unique card guide system which keeps the boards in their places.

The 8100 has support circuitry and sockets for eight 16K dynamic RAM chips allowing you to expand the memory of your TRS-80 by 16K without having to buy any S-100 RAM boards.

If you purchased an expansion memory kit for TRS-80 you could be left with eight 4K RAM chips and nowhere to put them. Well, they can go in the RAM sockets instead! That's right, you can use either 4K or 16K chips and address them anywhere you like.

The 8100 has a full RS232 20 ma serial interface which features include: RS232 and 20 ma current loop interface, software programmable baud rate from 10 to 56K baud, software programmable modem control lines, on board DB-25 connector and much more.

The 8100 also has an 8 bit parallel input port and an 8 bit parallel output port. Both are latched, have both positive and negative strobe inputs and outputs and have plenty of drive capability.

PRICES START AS LOW AS \$185\* (S-100 BUS INTERFACE ONLY)



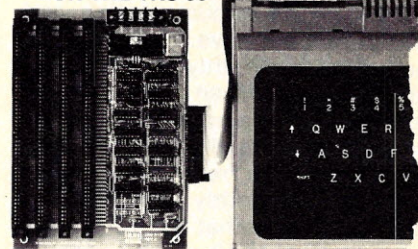
1429 Maple St.  
San Mateo, CA  
94402  
(415) 573-7359

CALL OR WRITE FOR COMPLETE PRICING INFORMATION AND MORE DETAILS  
THE 8100 IS AVAILABLE FROM LEADING COMPUTER DEALERS OR FACTORY DIRECT  
DEALER INQUIRIES INVITED  
\*Extra S-100 connectors, RAM support, I/O circuitry optional.  
USA DOMESTIC PRICE ONLY.

CIRCLE 151 ON READER SERVICE CARD

## HUH ELECTRONICS ANNOUNCES THE MINI-8100 AN S-100 BUS ADAPTER/MOTHERBOARD FOR THE TRS-80\*

MINI-SIZE!  
MINI-PRICE!



but MAXI-PERFORMANCE!

HUH Electronics' 8100 is the established leader in S-100/TRS-80 interfaces, running reliably since November 1978 and giving you the most features for your dollar. But some folks don't need all the 8100's versatility or want something more compact.

So we created the MINI-8100. The MINI-8100 has the same proven reliable S-100 Bus interface circuitry as it's big brother coupled with a 4 slot shielded motherboard. It connects to the TRS-80 or to the expansion inter-

face and opens up the vast world of S-100 Bus products to the TRS-80 owner.

For those of you who already own an S-100 mainframe or motherboard, the MINI-8100 may be purchased without the built-in motherboard, (MINI-8100S). Just plug it in and go!

The MINI-8100 has the same high quality as all HUH Electronics products—easy assembly, fully socketed, solder mask and silk screen component legend, comprehensive manual and design excellence that speaks for itself.

### PRICES

|                |  |         |
|----------------|--|---------|
| MINI-8100 KIT  | - includes all parts and one S-100 connector           | - \$115 |
| MINI-8100 ASM  | - assembled and tested, includes four S-100 connectors | - \$155 |
| MINI-8100S KIT | - S-100 sized board, plugs into mainframe              | - \$ 95 |
| MINI-8100S ASM | - same as above, but assembled and tested              | - \$125 |



1429 Maple St.  
San Mateo, CA  
94402  
(415) 573-7359

ORDERING INFO: The MINI-8100 is available from leading computer dealers or factory direct. Please include \$4 for shipping and handling. CA residents include 6% sales tax. We accept VISA or Mastercard or we can ship COD.

USA DOMESTIC PRICES ONLY.

DEALER INQUIRIES INVITED

\*TRS-80 is a Radio Shack® product.



# Amortization Schedules: For Home & Business

Paul Lamb

At income tax time one of the nice things about loans is that the interest expense is deductible on the income tax form. That is if we know what our interest payments are. Most firms provide us with their calculations for the interest but it would be interesting to be able to check their figures. Also, do you sometimes have doubts that your monthly payment really comes out to pay off your loan or are you paying too much. Is the remaining balance dropping very slowly or have you reached a point where it drops rapidly?

The Complete Amortization Schedule Program from Williams Radio & TV, Inc. (Computer Division) can shed some light on all these questions. You tell the program the interest rate, the amount of money borrowed and the length of time to repay (in months or years) and it will provide you with the monthly payment required to satisfy the loan. Also, it can provide a listing of each monthly payment, the accumulated interest paid, and the balance left, for the period of the loan. Doing this for your 30 year (360 month) mortgage can use up considerable paper, so the program offers the option of receiving a summary printout listing the total interest paid and the total amount paid (principal and interest).

I tried this program using the example in the documentation and then with a loan I have. The computer results for the monthly payment was one cent less than that in the example, but the end result was the same (within a couple of cents). But, when tried on the "real" loan, a large difference in monthly payment was noted. It appears that the 12 percent loan I obtained is 12 percent prepaid (not calculated by this program) and 12.125 percent on an amortization schedule. Had I known that when I took out the loan, I could have saved more than the cost of the program in that one transaction.

The program was loaded without difficulty, but doesn't follow the documentation exactly. Actually, the documentation appears to be for an earlier version. The program asks for a device designator for printing out the results (a listing device), an input not expected from the documentation. Also a name is asked for, as a heading on the output, and, again, not indicated by the documentation.

The program seemed to provide correct results, being a penny off from an example obtained from a neighbor (see Figure 1). Could this be a rounding error problem associated with the number of significant digits used? My North Star BASIC is set for 10 digits.

The program is rigid in that it requires as input the principal, interest rate, and number of payments; it will accept your input of monthly payment or calculate what the monthly payment should be. A simple expansion of the program to

permit input of the monthly payment and a calculation of the interest rate (effective interest rate) would be useful.

This program probably will not see a lot of application around the home. But for the small businessman, it would eliminate the table lookup required for each time payment sale.

The Complete Amortization Schedule Program is available from Williams Radio & TV, Inc., Computer Division, 2062 Liberty Street, Jacksonville, Florida 32206. \$15. □

## AMORTIZATION SCHEDULE FOR PETE BRAMMER

SUMMARY: \$1100.75 FOR 12 MONTHS AT 22.01 PERCENT  
MONTHLY PAYMENT = \$103.03

| >>>>> YEAR: 1979 <<<<< |         |          |           |           |            |
|------------------------|---------|----------|-----------|-----------|------------|
| MON                    | PMT     | INTEREST | TOTAL INT | PRINCIPAL | TOTAL PRIN |
| =====                  |         |          |           |           |            |
| FEB 1                  | \$20.19 | \$20.19  | \$82.84   | \$82.84   | \$1017.91  |
| MAR 2                  | \$18.68 | \$38.87  | \$84.35   | \$167.19  | \$933.56   |
| APR 3                  | \$17.13 | \$56.00  | \$85.90   | \$253.09  | \$847.66   |
| MAY 4                  | \$15.55 | \$71.55  | \$87.48   | \$340.57  | \$760.18   |
| JUN 5                  | \$13.95 | \$85.50  | \$89.08   | \$429.65  | \$671.10   |
| JUL 6                  | \$12.31 | \$97.81  | \$90.72   | \$520.37  | \$580.38   |
| AUG 7                  | \$10.65 | \$108.46 | \$92.38   | \$612.75  | \$488.00   |
| SEP 8                  | \$8.96  | \$117.42 | \$94.07   | \$706.82  | \$393.93   |
| OCT 9                  | \$7.23  | \$124.65 | \$95.80   | \$802.62  | \$298.13   |
| NOV 10                 | \$5.47  | \$130.12 | \$97.56   | \$900.18  | \$200.57   |
| DEC 11                 | \$3.68  | \$133.80 | \$99.35   | \$999.53  | \$101.22   |

SYNOPSIS: \$1100.75 FOR 12 MONTHS AT 22.01 PERCENT  
DATE OF TRANSACTION: FEB 1979  
MONTHLY PAYMENT : \$103.03  
AMOUNT OF INTEREST PAID IN 1979 : \$133.80  
AMOUNT PAID TOWARD PRINCIPAL IN 1979 : \$999.53  
TOTAL INTEREST PAID SINCE FEB 1979 : \$133.80  
TOTAL PRINCIPAL PAID SINCE FEB 1979 : \$999.53

| >>>>> YEAR: 1980 <<<<< |        |          |           |           |            |
|------------------------|--------|----------|-----------|-----------|------------|
| MON                    | PMT    | INTEREST | TOTAL INT | PRINCIPAL | TOTAL PRIN |
| =====                  |        |          |           |           |            |
| JAN 12                 | \$1.86 | \$135.66 | \$101.22  | \$1100.75 | \$0.00     |

SYNOPSIS: \$1100.75 FOR 12 MONTHS AT 22.01 PERCENT  
DATE OF TRANSACTION: FEB 1979  
MONTHLY PAYMENT : \$103.08  
AMOUNT OF INTEREST PAID IN 1979 : \$1.86  
AMOUNT PAID TOWARD PRINCIPAL IN 1979 : \$101.22  
TOTAL INTEREST PAID SINCE FEB 1979 : \$135.66  
TOTAL PRINCIPAL PAID SINCE FEB 1979 : \$1100.75  
LOAN PAID OFF IN JAN 1980

FINAL PAYMENT = \$103.08  
TOTAL PAYMENTS = \$1236.41

Paul Lamb, 13101 Parson Lane, Fairfax, VA 22030.



# creative computing book service

## Business Applications

### Accounts Payable and Accounts Receivable

*Poole & Borchers.* Includes program listings with remarks, descriptions, discussion of the principles behind each program, file layouts, and complete step-by-step instructions. Covers accounts payable and receivable in regard to invoice aging, general ledger, progress billing, partial invoice payments, and more. 375 pp. \$15.00 [10V]



### Small Computer Systems For Business

*Gerald A. Silver.* Useful for operators, programmers, teachers, students, etc., this book explores the world of small computers: what they are, how they are used, their internal structure, and our means of communicating with them. Describes assemblers, interpreters, and compilers, as well as operating systems and small computer applications. 254 pp. \$9.95 [10Y]

### Some Common BASIC Programs

*Poole & Borchers.* This book combines a diversity of practical algorithms in one book: matrix multiplication, regression analysis, principal on a loan, integration by Simpson's rule, roots of equations, chi-square test, and many more. All the programs are written in a restricted BASIC suitable for most microcomputer BASIC packages, and have been tested and debugged by the authors. \$8.50 [7M]

### Payroll with Cost Accounting in BASIC

*Lon Poole.* Includes program listings with remarks, descriptions, discussion of the principles of each program, file layouts, and a complete user's manual with step-by-step instructions, flow charts and sample reports with CRT displays. 356 pp. \$15.00 [10W]

### How to Profit From Your Personal Computer: Professional, Business and Home Applications

*T.G. Lewis.* Put your computer to work for you. This new guide describes the use of personal computers in common business applications, including terms, notations, and techniques used by programmers. 256 pp. \$8.95 [10X]

### BASIC With Business Applications

*Richard W. Lott.* This book focuses on the BASIC language and its application to specific business problems. Part one introduces the BASIC language and the concept of logical flowcharting. Part two presents problems and possible solutions. Topics include: interest rate calculations, break-even analysis, loan rates, and depreciation. This book is a great aid to the beginner wanting to learn BASIC without having a technical or scientific background. 284 pp. \$10.50 [10Z]

"The real purpose of books is to trap the mind into doing its own thinking."



## Computing Milieu

### COMPUTERS, COMPUTERS, COMPUTERS In Fiction And In Verse

*D. Van Tassel, Editor.* This collection of stories, commentaries and poems project the reader into a world where lifestyles are dominated by the computer to an extent far greater than they are by the telephone today. By revealing reactions and effects, the stories offer the reader insight into what is a potential reality. Cleverly-written, this book should entertain anyone who is aware of the computer's impact on society. Includes work by such distinguished writers as Gordon R. Dickson, Art Buchwald, Michael Shaara and Bob and Ray. 192 pp. \$6.95 [9X]

### The Home Computer Revolution

*Ted Nelson.* Here is one of the most controversial books on home computers. Nelson takes a look at how the "dinky" computers got here, where they are where they're going and what will become of the big boys like IBM. This thought-provoking and highly opinionated book picks up where *Computer Lib/Dream Machine* left off. 224 pp. \$2.00 [9U]

### PCC's Reference Book of Personal and Home Computing

Ever try to find the address of a manufacturer of a cassette interface that a friend told you about 2 weeks ago? Frustrating isn't it? This book will go a long way toward ending that frustration with its comprehensive list of manufacturers, stores and products. Also contains survey articles on software, hardware, kits and applications as well as an index of articles from various hobbyist magazines. Several bibliographies, too. \$5.95 [7P]

### Computer Lib/Dream Machine

*Ted Nelson.* This book is devoted to the premise that everybody should understand computers. In a blithe manner the author covers interactive systems, terminals, computer languages, data structures, binary patterns, computer architecture, mini-computers, big computers, microprocessors, simulation, military uses of computers, computer companies, and much, much more. Whole earth catalog style and size. A doozy! 127 pp. \$7.00 [8P]

## Space and Science Fiction

### Star Wars Album

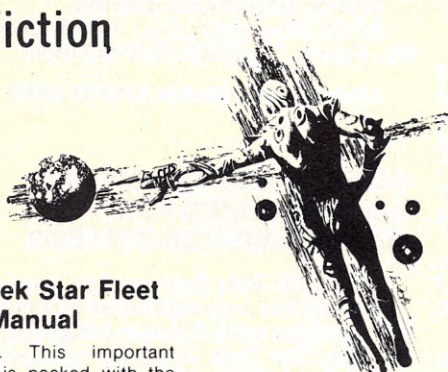
The incredible behind-the-scenes story of the most extraordinary motion picture of our time including over a hundred exclusive photos, special effects secrets, interviews with George Lucas, Carrie Fisher and Mark Hamill, the Anatomy of an Android and a technical glossary. Lots of color. 76 pp. \$5.95. [11A]

### Masterpieces of Science Fiction

This lavishly illustrated large format book has nine classic stories by Isaac Asimov, Gregory Benford, Ray Bradbury, Arthur C. Clarke, Harlan Ellison, Robert Heinlein, Frank Herbert, A.E. Van Vogt, and Kurt Vonnegut, Jr. Fabulous full color illustrations throughout. 108 pp. \$7.95. [11B]

### The Star Trek Star Fleet Technical Manual

*Franz Joseph.* This important resource book is packed with the data you need to create or modify STAR TREK computer games. It includes all Starship operating characteristics, defense and weapon systems, standard orbits, velocity/time relationship, space/war technology, Milky Way galaxy charts, Federation codes, etc., etc. A national best seller. Large format, vinyl binder. 180 pp. \$7.95 [8C]



### Star Wars Portfolio

Complete technical specifications and engineering drawings of ships, space stations, and 'droids of both The Imperial Empire and the rebels. A vital resource book. 180 pp. \$7.95 [11C]

## To Order

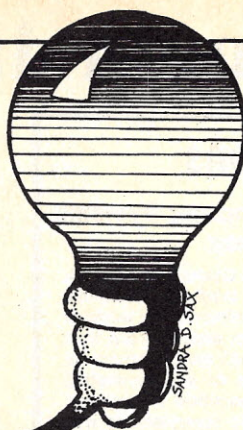
Use the bound-in order form or send your check for books plus \$2.00 shipping and handling per order (Foreign: \$1.25 per book) to Creative Computing, P.O. Box 789-M, Morristown, NJ 07960. NJ residents add 5% sales tax. Visa or MasterCard are acceptable also. For faster service, call in your bank card order toll free to:

**800-631-8112**  
(in NJ call 201 540-0445)





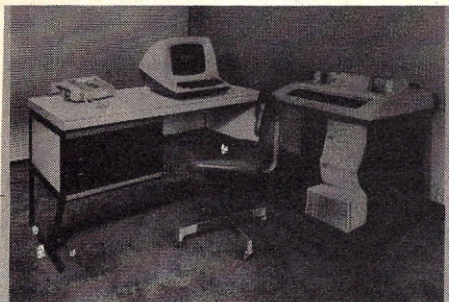
# Compleat Computer Catalogue



We welcome entries from readers for the "Compleat Computer Catalogue" on any item related, even distantly, to computers. Please include the name of the item, a brief evaluative description, price, and complete source data. If it is an item you obtained over one year ago, please check with the source to make sure it is still available at the quoted price.

Send contributions to "The Compleat Computer Catalogue," *Creative Computing*, P.O. Box 789-M, Morristown, NJ 07960.

## COMPUTERS



### BUSINESS SYSTEM

Industrial Micro Systems announces their complete microcomputer based system. The system consists of an attractive, industry unique mainframe enclosure with a cast aluminum front panel and woodside or rack-mount options. As pictured, a desk enclosure is also available with the system.

The standard configuration includes 32 Kbytes of memory, over 500 Kbytes of floppy disk storage and two serial I/O ports, all of the above are expandable.

The system can be delivered with the CP/M Operating System, including a multi-user version and the UCSD Pascal System.

The Schraff Group, 1000 Quail, Suite 140, Newport Beach, CA 92660, (714) 833-3660.

CIRCLE 226 ON READER SERVICE CARD

### MICRO-SLICE SINGLE BOARD COMMUNICATIONS COMPUTER

Micro-Slice is a complete Z80A-based communications computer on a single S-100 board for OEM, business, and hobbyist applications. It offers:

A 4mhz Z80 module, with power-on jump to any 256 byte boundary, 8 software prioritized interrupt inputs, and a real-time clock. It has up to 8K of ROM (2-2708, 2716, 2732), dip switch mappable to any 4K/8K boundary and a 2K static RAM (2114), dip switch mappable with the ROM to any 4K boundary; The Micro-Slicer also has an asynchronous/synchronous serial port with 16 software-selectable baud rates; two fully buffered bidirectional parallel ports; four bi-directional USART control ports, 2 real-time clock control ports, 2 single bit status ports; slave mode operation; and front panel software, with examine, deposit, call, input, output, jump, block transfer and search commands, and USART initialization supplied as either listing or preprogrammed on EPROM. \$349.00 kit, \$395.00 assembled and tested.

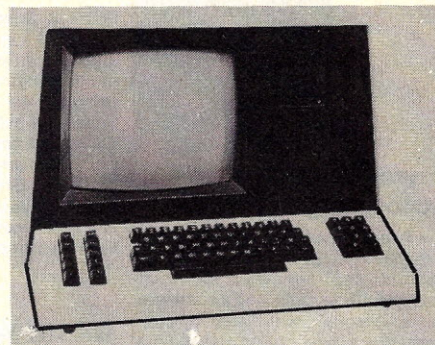
Micro Diversions, Inc., 8455-D Tyco Rd., Vienna, VA 22180, (703) 827-0888.

CIRCLE 227 ON READER SERVICE CARD

### SCIENTIFIC DATA SYSTEMS REESTABLISHED FOR MICROCOMPUTER SYSTEMS

Scientific Data Systems has been reestablished as a manufacturer of innovative, low cost small business computers.

Scientific Data Systems was incorporated in June of 1977 and made deliveries of its first system in December 1978. The system, called SDS 420, is a complete desk-top computer system based on the high speed 6502A microprocessor. Incorporating high quality components and functioning under a big computer type operating system, the system sells for under \$8,000 in single



units. The SDS 420 is being sold through dealers nationwide.

All subsystems are modular for simple servicing. The system includes:

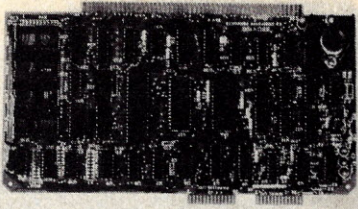
- The state-of-the-art 2MHz 6502A microprocessor.
- 32 Kbytes of memory with 250 nanosecond cycle time, expandable to 56K, and contained on a single pc board.
- From 1-1/2 to 10 megabytes of floppy disk storage on the ultra-high speed PerSci dual-diskette, single-double density drives. Dual head drives are optional. Up to four drives can be supported by the system.
- A high resolution Ball Brothers 12-inch CRT display with 25 lines of 80 characters per line and an independent 2K byte refresh memory.
- An easy-to-use, SDS designed, 71 key alpha-numeric detachable keyboard with decimal pad, cursor control, reset and interrupt keys and three user programmable keys.

The SDS 420 employs an extended 12K BASIC interpreter which provides all the features of standard BASIC plus commands for formatted printing, the input of strings with embedded terminators and extensive string manipulative commands. \$7700.

Scientific Data Systems, Inc., 12640 Beatrice Street, Los Angeles, CA 90066, (213) 390-8673.

CIRCLE 228 ON READER SERVICE CARD





### SBC-100 SINGLE BOARD COMPUTER

SD Systems announces the SBC-100 Single Board Computer. The powerful Z80 microprocessor is the heart of the SBC-100. The SBC-100 is designed to be used without a front panel and replaces many lower level CPU boards. A full single board computer, the SBC-100 offers features that allow it to be coupled with a controller interface to give a complete control unit for industrial applications.

Among the many features are: 1K on board RAM, 8K bytes PROM (using 2716), RS-232 serial I/O, parallel I/O, four channel counter/timer, software programmable baud rate generator, S-100 bus compatible.

SD Systems, P.O. Box 28810, Dallas, TX 75228, 800-527-3460.

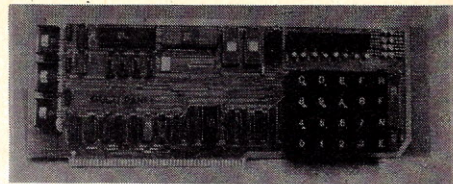
CIRCLE 229 ON READER SERVICE CARD

### INDUSTRIAL USER ORIENTED S100 PROCESSOR/CONSOLE

Industrial Modules, Inc. has introduced an S-100 processor/console board with integral CPU and console functions. Designed especially to work in industrial environments the INMOD-885 features a 3MHz 8085A CPU, powerful EPROM monitor, 20 digit keyboard and 8 digit prompting hex display.

The 8085A CPU executes all 8080 programs at 50% faster speed even though the system chip count and power supply requirements are reduced. By replacing the confusing binary front panel with hex keyboard/displays the user gains speed and versatility in programming and debugging. The prompting hex displays reduce the chance of error in reading or entering data and the clear hex console keyboard reduces the chance of conversion error in program entry.

The powerful conversational monitor provides usual I/O functions plus memory protect/unprotect, and two powerful debugging aids. Multi-Step allows you to define the number of instructions to be executed before control is returned to the monitor. The instructions are executed in real-time so that even time-dependent loops can be debugged. Multi-Break is a powerful new extension of the "break-point" concept, the hardware implemented function allows you to define a break-point for any address combination; I/O, data



or instruction. In addition, you can program the number of break-points "hits" before returning to monitor control. Or an I/O port can be monitored for transfer of the 256th byte. Of course, since this function is hardware implemented, ROM as well as RAM can be debugged easily. \$399.

Industrial Modules, Inc., P.O. Box 2985, Santa Clara, CA 95051, (408) 984-7698.

CIRCLE 230 ON READER SERVICE CARD

### APL/Z80

Vanguard Systems Corporation announces an APL interpreter for Z80 based microcomputers. APL/Z80 offers significant advantages in systems performance and ease of program development. APL/Z80 extends APL to the realm of low cost microcomputers. However, the power of APL/Z80 is comparable to APL on a large time sharing computer for many applications.

APL/Z80 includes dynamic execution of system commands; serial printer support; shared variables an auxiliary processor for I/O ports, which allows

## DISK TRS-80 DISK

Accounts Receivable, Accounts Payable, CPA Gen. Ledger, Gen. Payroll, Farm Payroll, Job Cost, Word Processing, Restaurant Payroll, Utility Billings, Depreciations.

*IMMEDIATE DELIVERY  
FULL CHAINING CAPABILITY  
ALL SYSTEMS LICENSED*

For sample reports send \$6.00 to cover postage & handling.

Each system is priced at \$240.00.

First time user cookbook documentation.

Money Order, VISA Master Charge only, Please.

Please state 2 or 3 disk systems.

|                |               |               |
|----------------|---------------|---------------|
| PAYROLL        | 2 DISK SYSTEM | 3 DISK SYSTEM |
| ACCTS. PAYABLE | 125 EMPLOYEES | 250 EMPLOYEES |
| ACCTS. REC.    | 200 VENDORS   | 400 VENDORS   |
| GEN. LEDGER    | 250 CUSTOMERS | 500 CUSTOMERS |
| JOB COST       | 125 ACCOUNTS  | 250 ACCOUNTS  |
|                | 25-45 JOBS    | 50-130 JOBS   |

## COMPUTER SYSTEMS DESIGN, INC.

P.O. Box 735  
Yakima, WA. 98907  
Call 1-509-575-0320

CIRCLE 140 ON READER SERVICE CARD

*Mike's*

YOUR

### NORTH STAR ★ COMPUTERS PROGRAMMING SPECIALISTS!

You can look to us for innovative and imaginative programs

**\*\* Intertec Intertubes now available \*\***

Thinker Toys 8" Disk Drives Many different and diversified for North Star Computers **\*995<sup>00</sup>** computers systems available. All Additional Drives **\*795<sup>00</sup>** include full access to Program Library. Systems start at **\*4,995<sup>00</sup>**

| DOSCHG  | CSUB  | TIMESHARE   |
|---|---|---|
| Patches to connect Thinker Toys 8" Disk Drives to North Star DOS & Basic. Fully supports all North Star Functions on 8" disk. | A set of Functions defined in North Star Basic that handle all disc accessing (Sequential, Random, & Keyed Access) and all CRT display, formatting & Input. A SUPERB APPLICATION PROGRAM DEVELOPMENT PACKAGE. | Patches to North Star DOS & BASIC that take advantage of the versatility of the Horizon computer to implement an interrupt driven bank-switching time sharing system. Requires additional memory & terminals. |
| <b>*49.95</b>   | <b>*49.95</b>   | <b>*49.95</b>   |

**Micro Mike's**

905 Buchanan, Amarillo, Texas 79101  
806-372-3633

CIRCLE 177 ON READER SERVICE CARD



complete, control using defined APL functions for any device interfaced to the Z80 I/O port; and an auxiliary processor implementation of a file system featuring a directly indexable file having variable length records.

Hardware required is Z80 CPU, disk drive, either serial ASCII APL console terminal or ASCII keyboard and video display board compatible with the Vector Graphic Flashwriter or Processor Technology VDM 1. \$350.

Manufacturers: Vanguard System Corporation will provide a custom

APL/Z80 supervisor for your system. Object code and source code licenses are available to certain qualified OEM's. Contact Vanguard Systems Corporation for details. A complete APL/Z80 system is available with dual drive floppy disk system with greater than one-half megabyte storage, keyboard, video display, price is \$6495.00.

Vanguard Systems Corporation, 6812 San Pedro, San Antonio, TX 78216. (512) 828-0555.

CIRCLE 231 ON READER SERVICE CARD



## MICROCOMPUTER SYSTEM FEATURES TV INPUT & DIGITAL TV DISPLAY

Beck Corporation has announced that it has developed a general purpose microcomputer system with special features for digital image processing.

Designated the Beck-1/System, the new product combines a general purpose microcomputer system with a programmable display processor capable of digitizing a TV input signal and displaying a digital TV picture.

Housed in an attractive terminal type enclosure, the unit includes a Z80 CPU, up to 64 kb of CPU Ram and 32 kb of CPU Rom, serial and parallel I/O ports, floppy disc storage including both mini and standard floppy drives, a keyboard and CRT display. A DMA controller, real time clock and floating point arithmetic unit are also available.

The Display Processor contains up to 32 kb of image Ram which can be displayed as characters, graphics, or a digital TV (gray scale) picture. Programmable parameters include character and pixel size and count, character blink, reverse, underline and half intensity. The unit features non-destructive zoom as well as horizontal and vertical panning in all 3 display modes.

Pixel density of the TV input A/D and gray scale display is up to 256 x 240 4 bit (16 levels) pixels. Graphics densities are up to 512 x 480 1 bit pixels. The unit can supply a RS170 compatible signal, interlaced or non-interlaced, or run off camera supplied sync - RS170, RS330, or random interlace.

Software available with the Beck-1/System includes the CP/M operating system, BASIC, and a comprehensive program development package with PASCAL and 3d graphics to be added in the near future.

The Beck-1/System is priced from \$2900 for the Beck-1/30A, a basic system with no disc storage, to \$6800 for the Beck-1/50C which includes TV in, graphics and digital TV display, 32kb CPU Ram and dual standard floppy discs.

Beck Corp., 303 Slocum Ave., Neptune, NJ 07753.

CIRCLE 232 ON READER SERVICE CARD



## Computer Mart of New York Delivers **The Unbeatable Combination For Accountants And Their Clients**

- ALPHA MICRO - The Mainframe Micro 16-bit, Time Sharing, Multi Tasking Computer System. Supports Multi-Terminals, Printers, Hard Disks from 10 to 1,200 Megabytes.
- COMPLETE ACCOUNTING PACKAGE - Proven Software, Accounts Receivable/Payable, Inventory, Order Entry, General Ledger, Mailing Lists.
- WORD PROCESSING with Internal Virtual Memory. (You only need 1½K to edit up to 64K file!)
- FAST DELIVERY of Integrated System
- SERVICE CONTRACTS with one day response
- 10 MEGABYTE SYSTEM from \$18,000

COMPUTER MART OF NEW YORK, INC.

118 Madison Ave.  
New York, N.Y. 10016

(212) 686-7923



CIRCLE 129 ON READER SERVICE CARD

For over 100 computer and robot cartoons, get the Colossal Computer Cartoon Book, only \$5.70 postpaid from Creative Computing, P.O. Box 789-M, Morristown, N.J. 07960.



## NEW WORD PROCESSING SYSTEM

A new system from Vector Graphic, called "MEMORITE 2," incorporates the firm's high-speed Z80-based MZ micro-computer with 630K bytes of disk capacity, their versatile "Mindless Terminal" and the Qume Sprint 5, 55 cps character printer.

For word processing applications, MEMORITE 2, with dual Micropolis floppy disk drives, features advanced text preparation, edit and delete capabilities. It offers automatic letter printing from memory with full formatting techniques such as underlining, indentation, automatic margins and variable line/character spacing. The system also performs mass mailings, allowing letters to be merged with address lists. As an additional feature, its memory is resident on PROM, so users need only type after a "power-up and proceed" function.

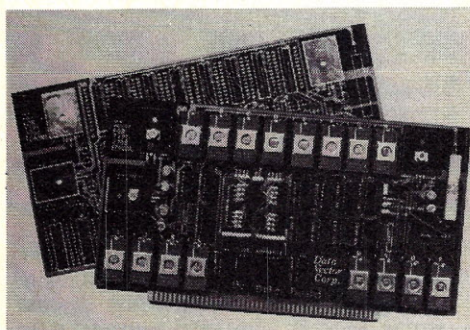


As a data processor, MEMORITE 2 is capable of performing standard accounting tasks and custom applications in Business Basic for small firms or departments of large companies. Scientific calculations are also available for technical environments. \$8950.

Vector Graphic Inc., 31364 Via Colinas, Westlake Village, CA 91361. (213) 991-2302.

CIRCLE 233 ON READER SERVICE CARD

## MEMORY



## EPROM MODULE

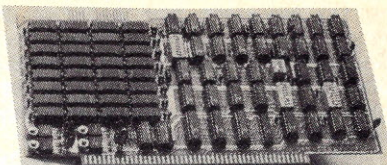
Data Vector Corporation has announced the Byte Board, a better EPROM module for the S-100 bus. The unit accepts up to sixteen 2708 EPROMs, incorporates a Power-On Jump capability, provides for wait state generation for slow memories, and possesses extreme addressing flexibility.

Each EPROM is individually addressable on any 1K boundary, and may be placed anywhere in the computer's address space, irrespective of where any of the other EPROMs are placed, and unused EPROM locations do not take up memory address space. All user selectable options are silk-screened onto the board, allowing the state of all options, including the address assigned to each EPROM, to be read directly from the board without referring to the manual.

The module is solder masked to minimize solder bridges during assembly, is fully socketed, has two spare IC pads for custom circuitry, and comes with a thorough 20 page owner's manual. \$99 assembled, \$69 kit - Fully loaded with 16 EPROMs, \$243 assembled or \$213 in kit form.

Data Vector Corporation, P.O. Box 3141, Burbank, CA 91504.

CIRCLE 234 ON READER SERVICE CARD



## 64 BYTE DYNAMIC RAM BOARD

Alpha Micro, announces the availability of an S-100 Bus-compatible 64K byte Dynamic RAM memory board. It is completely compatible with the 16-bit Alpha AM-100 CPU.

SuperRam is a high-density random access memory board capable of storing up to 65,536 bytes of data on a single board. Completely S-100 bus compatible, it utilizes 16K dynamic RAMs to achieve maximum bit density, minimum power dissipation, and optimum cost/performance ratio.

Refresh requirements are satisfied on the SuperRam board without support

# The COMPUTER FACTORY

TO ORDER CALL TOLL FREE 800-223-7318

**COMMODORE "PET"**

only \$795 USED \$549

- 14K ROM Operating system
- 8K RAM Memory
- 9" Video Monitor
- Built in Keyboard
- Digitally controlled tape

Today's best value in personal computers, along with the latest in peripherals, are always in stock at the COMPUTER FACTORY.

**NEW! PET BUSINESS SYSTEM**

The PET is now a truly sophisticated Business System with the Floppy Disk and Printer which makes an ideal cost efficient business system for most professional and specialized fields: medicine, law, research, engineering, education, etc.

**PET 2001-16K \$995**  
**32K \$1195**

- 16 or 32K Bytes Dynamic RAM
- 14K ROM Operating System
- 9" CRT
- Upper/Lower Case and Graphics
- Full Sized Business Keyboard
- Full Screen Editing
- Operating system will support multiple Languages (BASIC resident)
- Machine Language Monitor
- 8K ROM Expansion Sockets

**ELECTROSTATIC PRINTER 2021**

• 80 column dot matrix

• Full PET graphics

• 8 1/2 inch paper!

**PET 2001-16K \$995**  
**32K \$1195**

- Bottom and Rear Tractor Feed
- 8 1/2" Paper Width
- 6504 Microprocessor Controlled
- 112 cps Bi-directional
- 4K ROM - 16K RAM
- Upper/Lower Case and Graphics
- 7 x 6 Dot Matrix

**PET PRINTERS 2023 \$849**  
**2022 \$995**

(Includes Tractors)

- Bottom and Rear Tractor Feed
- 8 1/2" Paper Width
- 6504 Microprocessor Controlled
- 112 cps Bi-directional
- 4K ROM - 16K RAM
- Upper/Lower Case and Graphics
- 7 x 6 Dot Matrix

**DUAL DRIVE FLOPPY DISK 2040 \$1095**

- 360 K Bytes Storage
- High Speed Data Transfer
- Plugs into IEEE Port
- 6504 Microprocessor
- 8K ROM Operating System
- 8K ROM Encoding and Decoding
- 4K RAM
- Uses Single or Dual sided Disks

**SINGLE DRIVE FLOPPY UNIT 2041 \$595**

- Intelligent mini floppy
- 171.5K net user storage

**FREE** \$25 of Software with purchase of any computer on the page

**Word Processing For PET.** With this program in hand, you can create text and add, delete, center, recall lines and move text around on page or between pages. Use either PET or terminal keyboard. \$45.00

**NEW! BILLINGS MICROSYSTEM EXPANDABLE TO 2 MEGABYTES**

features:

- 12" CRT
- 64K RAM
- Z-80
- Dual mini floppy
- 320 K Storage
- Graphics
- 64 Keys
- 2 RS-232 ports
- 1 parallel port

only \$3645

**BUSINESS SOFTWARE AVAILABLE!**

**Compucolor II**

COMPUCOLOR II Disk-Based Model 3

Advanced hardware and software technology gives you:

- 13" Color Display
- Advanced Color Graphics
- 11K Disk Built-in
- 16K ROM Operating System
- 8K RAM User Memory
- 4K RAM Refresh
- 8080A Microcomputer
- RS-232 I/O

Every unit comes with an extended DISK-BASIC that has full file management capability resident in the COMPUCOLOR II in 16K of ROM. Color is fantastic, but COMPUCOLOR II has the power to handle complex tasks and small business applications. An impressive software library supplements your own creativity.

**\$1495 Complete!**  
**16K Model add \$200**  
**32K Model add \$500**

**SALE! Come In Or Call For Special Low Prices**

**WE'RE MOVING TO LARGER QUARTERS AND MUST SELL EVERYTHING IN OUR INVENTORY**

**BUSINESS COMPUTER IMSAI**

The low cost solution for all small business problems. A wide variety of software is available for all your needs. PCS series include dual floppies, 32K RAM, I/O, DOS, BASIC

- PCS-42 (400K) \$2995
- PCS-44 (768K) \$3995
- VDP-42 series adds video terminal, keyboard and VIO to above.
- VDP-42 \$4795
- VDP-44 \$4495
- VDP-80 \$6995

**SORCERER SPECIAL 12" Video Monitor for SORCERER (\$299 value) ONLY**

**\$125 with 8K unit**  
**95 with 16K unit**  
**65 with 32K unit**

**PERIPHERALS FOR PET**

- 24K Memory Expansion \$499
- PET to RS232 Serial \$169
- 2 Way Serial Communication \$49
- Modem Board for PET \$375
- PET to S100 (4-slot) \$160
- Second Cassette Drive \$5
- Parallel Printer Interface \$99

**RADIO SHACK • PET • SORCERER • APPLE • COMPUCOLOR • ETC.**

**PRINTERS • PRINTERS • PRINTERS**

The COMPUTER FACTORY'S extensive CENTRONICS 779... \$1045 inventory and wide selection of computer AXIOM (Parallel)... 395 printers assures you of finding the printer AXIOM (Serial)... 495 best suited for your needs and EXPANDOR (Tractors) 425 specifications. The following printers work INTEGRAL DATA 795 well with all known personal computers. QUME or DIABLO... 3400

**APPLE II from \$970**

Open Mon.-Fri. 10-6 Sat. 10-4

**SPECIAL SALE** Buy any computer and take 10% off price of printer of your choice

TO ORDER CALL TOLL FREE 800-223-7318

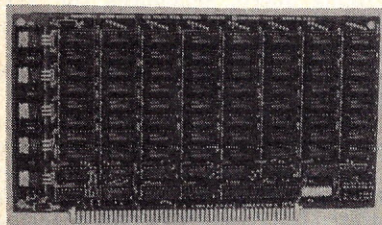
**The COMPUTER FACTORY** 485 Lexington Avenue 750 Third Avenue New York, N.Y. 10017 (212) 687-5001 (212) PET-2001 Foreign order desk • Telex 640055



from the processor, and therefore, are transparent to the user. Exact and reliable internal timings are generated on-board using digital delay line techniques. Memory is addressable as independent 16K blocks.

Alpha Micro, 17881 Skypark North, Irvine, CA 92714. (714) 957-1404.

CIRCLE 235 ON READER SERVICE CARD



## NEW MEMORY BOARD

Industrial Micro Systems has announced the Model 370. It is a 32 Kbyte static RAM board that operates on the S-100 bus.

The board's starting address can be selected at 4K boundaries. Memory mapping capability is included so that more than 64 Kbytes of memory can be utilized in a system. Processor Write or Memory Write signals can be selected for writing data into memory, and the Phantom Line capability is included.

The Schraff Group, 1000 Quail, Suite 140, Newport Beach, CA. 92660, (714) 833-3660.

CIRCLE 236 ON READER SERVICE CARD



## ITHACA AUDIO APPLE II & SORCERER 16K UP-GRADE KITS

Ithaca Audio expands its line of high density, high quality 16K memory expansion kits with the introduction of two more Simple Up-Grade Kits: the Simple Apple II and the Simple Sorcerer Up-Grade Kits. Each kit is complete, including eight prime tested 16K RAMs, plus the proper preprogrammed jumper shunts or memory units. The attractive package includes anti-static foam to protect all components. Installation is quick and easy with the simple instructions that are included. In addition, all parts are pre-tested and 100% guaranteed for life.

The Simple Up-Grade Kits are available nationwide at Byte Shops, Computerlands and most independent dealers.

Ithaca Audio, Box 91, Ithaca, NY 14850, (607) 257-0190.

CIRCLE 237 ON READER SERVICE CARD

## 16-64K RAM BOARDS

Processor Technology has introduced four dynamic RAM boards with capacities of 16K, 32K, 48K, and 64K bytes — collectively designated the nKRA RAM boards.

A minimum of components are used to reduce probability of failure. ICs are mounted in sockets so they may be replaced readily to correct any abnormality that appears during factory tests. Refresh is synchronous, so no wait states can slow the microprocessor. Switch-selectable addressing eliminates jumper wires and the need to power down when readdressing blocks of memory.

Worst case access time is 400 nsec. Cycle time is 520 nsec. Power requirements are +8 to +40 VDC at 1 mA maximum, +15 to +19 VDC at 150 mA maximum and -15 to -19 VDC at 50 mA maximum. No power supplies need be regulated. \$429 to \$1350.

For the location of newest dealer, dial toll-free Processor Technology's dealer locator hotline 800-227-1241 (In California dial 800-972-5951). For new product literature: Processor Technology Corporation, 7100 Johnson Drive, Pleasanton, California 94566.

CIRCLE 238 ON READER SERVICE CARD

## Skyles Makes It Easier: Be First on Your Block To Own this Terrific PET Trio

The PET computer, the Skyles BIG KeyBoard, and the 8K or 16K MEMORY EXPANSION SYSTEM.

While a lot of people already own — proudly — the Skyles BIG KeyBoard or the Skyles Memory Expansion System, not enough own both. So we're making it easier to own these easy-to-install, no-tools-needed, super-quality peripherals:

|  |                  |
|--|------------------|
| <b>Skyles BIG Keyboard</b>               | <b>\$125.00*</b> |
| shipping and handling                    | 5.00             |
| <b>Skyles 8K Memory Expansion System</b> | <b>\$250.00*</b> |
| shipping and handling                    | 3.50             |
| <b>Complete</b>                          | <b>\$383.50*</b> |

**Now: Buy both and pay only \$350.00\*. Save \$33.50.**

Save with the 16K Memory Expansion System, too. Normally \$450.00 plus \$5.00 shipping and handling. **Buy both the 16K and the BIG KeyBoard and pay only \$525.00\* complete. Save \$60.00!**

To order: Please enclose your check (plus sales tax for California residents\*). Mastercharge or VISA invited. Please indicate your card number and expiration date. **NOTE, OFFER GOOD ONLY 'TIL MAY 30, 1979.**



**Skyles Electric Works, Inc.**

599 N. Mathilda Ave. • Sunnyvale, CA 94086 • (408) 735-7891

\*California residents add 6% (6.5% in BART, Santa Clara or Santa Cruz Counties.)

CIRCLE 213 ON READER SERVICE CARD

## TERMINALS



## SE-2000 ELECTRONIC TEXT EDITING TYPEWRITER

The Adler Word Processing Division of Adler-Royal Business Machines, Inc., announces its new model SE-2000 electronic text editing typewriter.

The SE-2000 has a built-in working memory that stores up to two pages of typing, and its mini-diskette system stores up to 32 additional pages on each individual mini-diskette. Documents stored in the SE-2000's working memory can be automatically printed at a rapid 240 words per minute.

All operations are swiftly and conveniently performed right from the keyboard.

Other convenient features of the Adler SE-2000 are: 47 contoured keys; all typing keys have repeat action capa-



bility; optional attachment for handling pin-feed continuous forms with end of paper sensor; carbon ribbon cartridge; lift off correction ribbon; self-diagnostic system and modular design for prompt and easy servicing; indicator for remaining character capacity in working memory; automatic text linking; and automatic pagination.

No matter what revisions are made to stored text, they can be made simply and rapidly, because only the revisions are typed. This is made possible by the use of a search word and/or locator keys which pinpoint a character, word, line or page. As a further aid to simplify typing of lengthy documents, there's an automatic table of contents for mini-diskettes, and text is automatically paginated, to conform to the number of additions or deletions made.

Adler-Royal Business Machines, Inc.,  
1600 Route 22, Union, NJ 07083.

CIRCLE 239 ON READER SERVICE CARD

## DIABLO CONTROL PROGRAM

Computer Services in Hickory, N.C. announces a new control program for the Diablo Hytype II printer called BI-DIRECT.

The first release is available for the CP/M operating system and allows the user to increase the printing speed as well as easier control of the printer functions.

BI-DIRECT takes the next output to the list device and formats it for bi-directional printing. It offers the user

easier control over spacing between the printed characters and between the lines along with changing of the printing color from black to red at any time. Paging control and headers printed at the top of each page are also a part of BI-DIRECT.

Any or all of the functions of BI-DIRECT can be turned on or off under user program control.

BI-DIRECT is shipped on an 8-in. CP/M format diskette. \$99.95.

Computer Services, 30 Hwy. 321,  
NW, P.O. Box 2292, Hickory, NC 28601,  
(704) 294-1616.

CIRCLE 240 ON READER SERVICE CARD



## QYX TYPEWRITER

Qyx employs the latest in microprocessors and Large System Integration (LSI) technology. There are three microprocessors at work in the unit operating in a multiprocessing mode. The Zilog Z-80 Microprocessor functions as the central control of the system. Zilog is another high-technology member of the Exxon Information Systems family.

Both the linear and rotary stepper motors are microprocessor controlled via a feedback system which facilitate precise positioning of the characters on paper. The super capacity ribbon cartridge is stationary. Ribbon is fed through flexible leaders, thus lowering inertia on the carrier and permitting a larger ribbon supply than is typically found on high-speed printers. This ribbon cartridge is also designed for quick and clean replacement.

Other technological innovations facilitate upgrading Qyx with memory, editing and communications capabilities.

Electronic editing is accomplished with a 24-character text display that fits inside the face of the machine. The function is activated by adding a computer card in the control section of the machine. A communications card is also available that permits direct interface with other Qyx typewriters over voice-grade telephone lines.

Qyx, A Division of Exxon Information Systems, P.O. Box 1979, Exton, PA 19341, 800-523-5000.

CIRCLE 241 ON READER SERVICE CARD

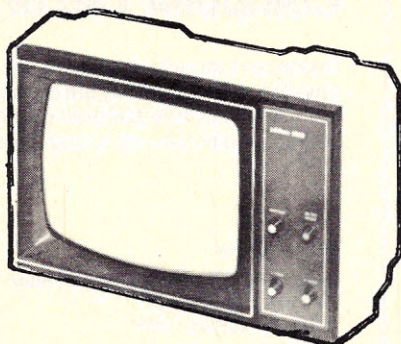
**VisiCalc™**  
*How did you ever  
do without it?*

CIRCLE 167 ON READER SERVICE CARD

# THE PERFECT COMBINATION

**\$139.00**

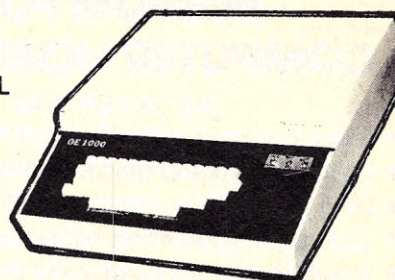
**VIDEO 100  
MONITOR**



The Video 100 is designed to meet your monitor needs for both personal and business use. It is compatible with a wide range of computer systems, and with a bandwidth of 12 MHz it is capable of displaying up to 80 characters per line on this 12" B/W CRT. The solid state circuitry assures a stable & sharp display. The front panel controls include power, contrast, horizontal and vertical holds. Adjustments for height, vertical linearity, and width control are located on a rear panel. All the above features for only \$139.00.

**OE 1000  
VIDEO TERMINAL**

**\$275.00**



The OE 1000 Video Terminal provides you with a low cost means to communicate with your computer. The OE 1000 will display 16 lines of 64 characters on a monitor or modified TV. The terminal will generate and display the full 96 ASCII character set (upper and lower case) plus 32 special characters (Greek letters and math symbols). The terminal will also erase to end of line, erase to end of screen, scroll, and it has full X-Y cursor movement. Interfacing to your computer requires a full duplex, serial, RS232 or 20 mA loop I/O port at the rate of 110 or 300 baud. The OE 1000 sells for \$350 assembled or \$275 in kit form.

Master Charge, Visa, accepted. COD Extra. Add \$5 per unit, \$10 both units, shipping handling insurance.

The perfect low cost combination of the OE 1000 and Video 100 are available from

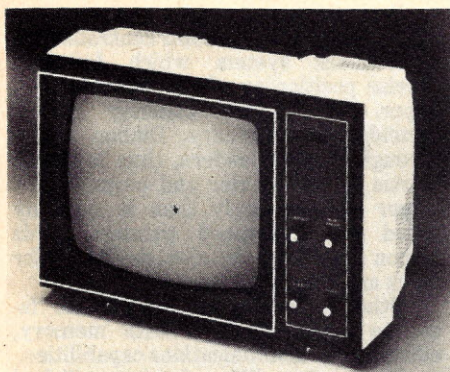
**OTTO ELECTRONICS**

PO BOX 3066, PRINCETON, NJ. 08540 or call (609) 448-9165

CIRCLE 185 ON READER SERVICE CARD







### LOW-COST VIDEO TERMINAL

A new black and white, low-cost 12-inch video terminal is now available for home, personal or business computer systems and/or surveillance monitors. The monitor is light weight and features solid state circuitry that results in a sharp, stable picture.

Besides being compatible with many computer systems, here are some of the terminal's other advantages: composite video input, video bandwidth of 12 MHz  $\pm$  3dB, 75 ohm input impedance, high resolution. \$144.

Micro Products Unlimited, P.O. Box 1525, Arlington, TX 76010, (214) 461-8043.

CIRCLE 242 ON READER SERVICE CARD

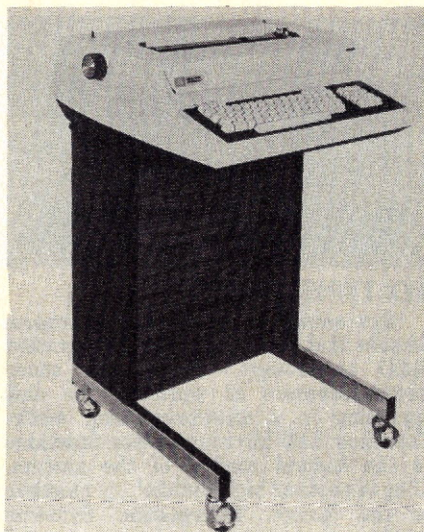
For over 100 computer and robot cartoons, get the Colossal Computer Cartoon Book, only \$5.70 postpaid from Creative Computing, P.O. Box 789-M, Morristown, N.J. 07960.

### 30 CPS DAISYWHEEL TERMINAL

Anderson Jacobson, Inc. announces new lower lease and purchase prices for their AJ 830, a 30 cps daisywheel teleprinter terminal.

On a 12 month lease, the AJ 830 is available for \$113 per month including maintenance. Quantity discounts and longer term leases are also available at substantially reduced prices.

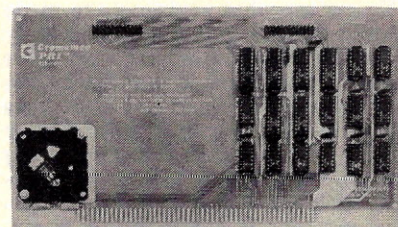
The AJ 830 features high quality daisywheel print; 10, 15 and 30 cps data throughout; multi-part forms capability; high resolution incremental plotting; and microprocessor control. Options for the



AJ 830 are a 45 cps print mechanism; APL keyboard; EBCD/Correspondence codes; paper trays; forms feed tractor; and pin feed platen. New \$2995.

Anderson Jacobson, Inc., 521 Charcot Avenue, San Jose, CA 95131, (408) 263-8520.

CIRCLE 243 ON READER SERVICE CARD



### PRINTER INTERFACE CARD

Cromemco's new printer interface (PRI) card makes it easy to interface either dot-matrix or daisy-wheel printers to your computer system.

One interface uses the "Centronics parallel" convention and interfaces with Cromemco Model 3779 or 3703 dot-matrix printers. The second interface uses the "daisy-wheel parallel" convention and interfaces with Cromemco Model 3355 daisy-wheel printer.

The second interface has built-in ribbon-lift and ribbon-lowering circuitry to free the software over-head normally required for this function. Each of the two interfaces has an individual cable connection on the top edge of the card. \$195. Cables for the PRI interface are

## THE CLASSIFIED AD MEDIUM FOR COMPUTER HOBBYISTS

### WE OFFER YOU

- Extra low cost classified advertising
- Low cost old and new equipment
- Original software from actual users
- Computer Club meeting dates
- A publication to supply the information you desire

## BUY / SELL / EXCHANGE

- HARDWARE ● SOFTWARE
- NEEDED INFORMATION

MAILED FIRST CLASS MAIL MONTHLY  
EXTRA LOW AD RATES

ONE YEAR SUBSCRIPTION ONLY \$5.00

## THE COMPUTER EXCHANGE

2217-A Freeland Way  
Dallas, Texas 75228

CIRCLE 122 ON READER SERVICE CARD

## Computer Lab of New Jersey

Computer Lab sells the best S-100 Bus products at the best possible prices. Not only are our prices great, so is our delivery. We offer a 10% discount on most major lines, plus a 5% additional discount for a cash purchase.

|                                      | LIST<br>PRICE | OUR<br>CASH<br>PRICE |
|--------------------------------------|---------------|----------------------|
| SSM I/O-4 Kit                        | \$149.95      | \$128.20             |
| Integral Data Systems IP-22S Printer | \$949.00      | \$811.39             |
| P1210 Option - add                   |               | \$ 33.34             |
| Graphic Option - add                 |               | \$127.39             |
| Vector Graphic 8K Ram                | \$245.00      | \$209.47             |
| Thinker Toys Speakeasy I/O Kit       | \$130.00      | \$111.15             |

Subject to available quantities. Prices quoted include cash discount.  
Shipping and Insurance extra

### Call for our prices on:

Cromemco, Godbout, IMSAI, IMC, Meca, Micropolis, Problem Solver, SSM, Sorcerer, Vector Graphic

### Computer Lab of New Jersey

141 Route 46 • Budd Lake, N.J. 07828  
Phone: (201) 691-1984

HOURS: Monday & Friday: 12 to 6, Tuesday-Thursday: 12 to 9  
Saturday: 10 to 5

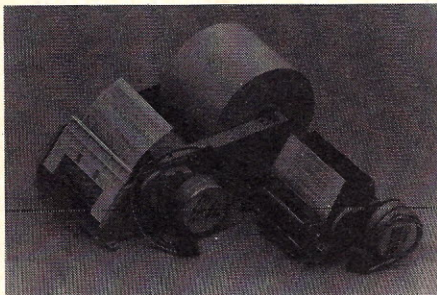
Call or write for our free catalog & price list



available in two lengths: 62 cm (Model CBL-2) for \$15.00 and 110 cm (model CBL-3) for \$15.00.

Cromemco, Inc., 280 Bernardo Ave., Mountain View, CA 94043, (415) 964-7400.

CIRCLE 244 ON READER SERVICE CARD



### LOW-COST ALPHA NUMERIC PRINTERS

American Micro Products offers two quality, compact, light-weight, 5 x 8 dot matrix printers. Designed for the hobbyist and OEM alike, both the 12 column PL12 at \$59.95 and the 20 column PL20 at \$99.95 provide quiet economical hard copy output.

A general specification manual, art work for a printed circuit board, parts list, flow chart, and schematics describing the 8-bit parallel interface (Centronics-type) are included with each printer. In addition, the microprocessor control chip and the PCB\* are available

as options. These key elements of the interface are priced at \$99.95 and \$29.95\* respectively.

American Micro Products, 6550 Tarnef M/S 11, Houston, TX 77074. (713) 777-2673.

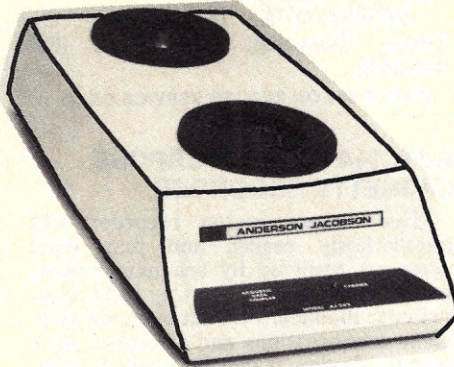
CIRCLE 245 ON READER SERVICE CARD

### NEW TTL-COMPATIBLE ACOUSTIC COUPLER — AJ 243

Anderson Jacobson, Inc. announces the AJ 243, designed to interface with transistor-to-transistor logic (TTL) teleprinter terminals.

The AJ 243 is compatible with any low speed terminal utilizing a TTL interface. Cables are available for connection to either Teletype's Model 43 or DEC's LA-36 DECwriter. Cables for other terminal models can be supplied by the terminal manufacturer.

The AJ 243 offers full duplex 103/113

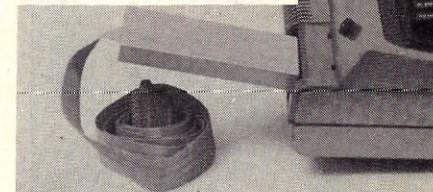


compatible operation at speeds up to 450 bps. A new cup design with positive handset lock and direct microphone/handset coupling technique provides maximum ambient noise isolation. \$265.

Anderson Jacobson, Inc., 521 Charcot Avenue, San Jose, CA 95131, (408) 263-8520.

CIRCLE 246 ON READER SERVICE CARD

### TRS-80 MODULAR PRINTER INTERFACE

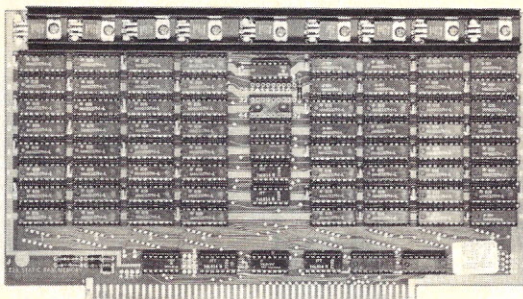


American Micro Products has announced a new parallel line printer interface for the Radio Shack TRS-80 computer. The TRS-80 Print Module, measuring 4 1/2" x 2 1/2" x 1/2", plugs directly into the back of the Radio Shack Computer (keyboard) and eliminates the need for the Expansion Interface when driving such printers as Centronics (P1, 779, & 703), Telpar, and Axiom. All line print commands in Level-II BASIC are compatible; and, because the Module draws power from the printer, the TRS-80 remains completely unaffected by the interface. \$99.95.

American Micro Products, 6550 Tarnef, M/S 11, Houston, TX 77074, (713) 777-2759.

CIRCLE 247 ON READER SERVICE CARD

## Tarbell 32K RAM Memory



- ★S-100 BUS ★ ★300ns ★ ★STATIC MEMORY ★
- ★9 REGULATORS PROVIDE EXCELLENT HEAT DISTRIBUTION ★
- ★EXTENDED ADDRESSING (Bank Switching) ★
- ★LOW POWER REQUIREMENT ★
- ★PHANTOM LINE ★
- ★20 PAGE OPERATING MANUAL ★
- ★FULL 1-YEAR WARRANTY ★

FULLY ASSEMBLED AND TESTED . . . . . \$625.  
SAME BOARD WITH ONLY 16K INSTALLED . . . \$390.

Please send check or money order. No CODs or credit will be accepted on this item. California residents please add 6% sales tax.

**Tarbell**  
Electronics

950 Doven Place • Suite B • Carson, Calif. 90746  
(213) 538-4251 (213) 538-2254

CIRCLE 130 ON READER SERVICE CARD

### EXTRAORDINARY VALUE !!

Distributors Of Quality Computer Terminals, Accessories, & Supplies

## "SMART" CRT TERMINAL

### \$845. (\$49/month Rental)

INFOTON 100 Video Terminals Now IN STOCK!

Get the following STANDARD features at our "Dumb" price.

Z-80 microprocessor design, 24X80 format, x-y addressing, cursor read command, block/character modes, insert/delete line, dual intensities, limited graphics capability, printer interface, switch selectable baud rates from 110 to 19,200 bps, EIA/Current Loop interfaces, etc.

Emulates LSI ADM 3A, Hazeltine 1400/1800, DEC VT-52, ADDS 520, P-E Fox.

CONTACT US TODAY TO PLACE YOUR ORDER OR TO OBTAIN MORE INFORMATION!

### Terminal Sales & Development, Inc.

30 COMMERCE STREET SPRINGFIELD, NEW JERSEY 07081

## (201) 376-8980

CLIP THIS COUPON TO SAVE \$\$\$

CIRCLE 138 ON READER SERVICE CARD



**Best Deal in Town!**

**Kim-1**  
\$159<sup>95</sup>

Power Supply \$34.95

**Apple II-16K**  
\$1029.

N.J. Residents add 5% Sales Tax

**Computer Corner**  
of New Jersey  
(201) 835-7080  
Pompton Lakes, N.J. 07442

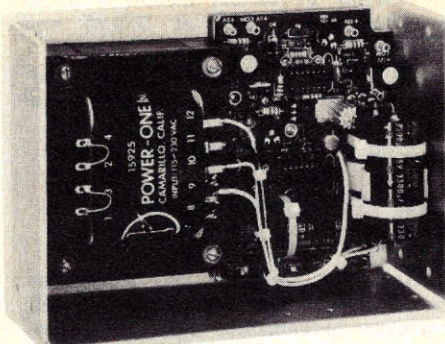
TUES. & THURS. 10 to 9  
WED. • FRI SAT 10 to 6  
CLOSED: SUN. & MON.

CIRCLE 120 ON READER SERVICE CARD

### NEW DEDICATED FLOPPY-DISK POWER SUPPLY ADDED TO POWER-ONE LINE

The CP-323, the fifth entry in POWER-ONE's line of linear D.C. dedicated Floppy-Disk power supplies, is now available.

The open frame CP-323 is designed to power two Mini-Floppy type Floppy Disk drives simultaneously. D.C. out-



puts provided are: +5V 2A with over-voltage protection set at 6.2V + 0.4V, and +12V 4A with overvoltage protection set at 15V + 1.0V.

An inhibit function is also provided to allow the user to sequence the +12V output on and off using a low level TTL signal. 1-9 quantities is \$74.95. Size is 7.00" x 4.87" x 2.75".

POWER-ONE, Inc., Power One Drive, Camarillo, CA 93010, (805) 484-2806.

CIRCLE 248 ON READER SERVICE CARD

### AUTOMATIC ALL-PURPOSE CASSETTE RECORDER

This voice-activated recorder will automatically record and play back messages received by scanning radios, tone-alert receivers, two-way radio base stations, mobiles, etc... It records telephone conversations and dictation. As a security device, it can be used to automatically record sounds or voices in your

home or office when you're away.

Other features include: digital tape counter; "LED" record indicator; positive solid-state motor control with end-of-tape shut off; adjustable schmitt-trigger input circuit with automatic level control; AC/rechargeable battery operation; and a built-in condenser microphone. Audio response characteristics are tailored to produce clean voice recordings on standard cassette tapes.



Optional accessories: TCE-124 Talking Clock for automatic time of day indexing in English, French, German, or Arabic; TR-150 FCC registered telephone coupler; RMC-8 remote microphone; RBC-4 rechargeable battery pack; WFC-101 ruggedized enclosure; and magnetic leader cassettes. \$94.00.

Omnicon Electronics, 127 Grove St., P.O. Box 623, Putnam, CT 06260, (203) 928-0377.

CIRCLE 250 ON READER SERVICE CARD

## You can use the versatile new BETSI to plug the more than 150 S-100 bus expansion boards directly into your PET\*!

On a single PC card, BETSI has both interface circuitry and a 4-slot S-100 motherboard. With BETSI, you can instantly use the better than 150 boards developed for the S-100 bus. For expanding your PET's memory and I/O, BETSI gives you the interface. The single board has both the complete interface circuitry required and a 4-slot S-100 motherboard, plus an 80-pin PET connector. BETSI connects to any S-100 type power supply and plugs directly into the memory expansion connector on the side of your PET's case. And that's it. You need no additional cables, interfaces or backplanes. You don't have to modify your PET in any way, and BETSI doesn't interfere with PET's IEEE or parallel ports. And—when you want to move your system—BETSI instantly detaches from your PET.

BETSI is compatible with virtually all of the S-100 boards on the market, including memory and I/O boards. BETSI has an on-board controller that allows the use of the high-density low-power "Expandoram" dynamic memory board from S.D. Sales. This means you can expand your PET to its full 32K limit on a single S-100 card! Plus, you won't reduce PET's speed when you use either dynamic or static RAM expansion with BETSI. Additionally, BETSI has four on-board sockets and decoding circuitry for up to 8K of 2716-type PROM expansion (to make use of future PET software available on PROM). BETSI jumpers will address the PROMs anywhere within your PET's ROM area, too.

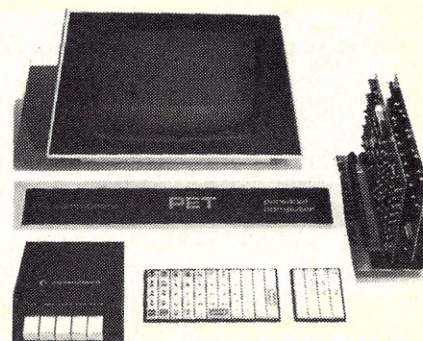
**MAIL ORDERS ARE NORMALLY SHIPPED WITHIN 48 HOURS. VISA AND MASTER-CHARGE ORDERS ARE BOTH ACCEPTED.**

The BETSI Interface/Motherboard Kit includes all components, a 100-pin connector, and complete assembly and operating instructions for \$119.

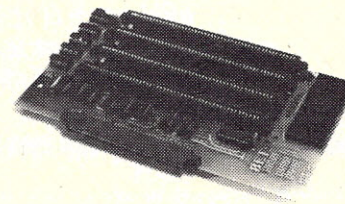
The Assembled BETSI board has four 100-pin connectors, complete operating instructions and a full 6-month Warranty for just \$165.

### FORETHOUGHT PRODUCTS

87070 Dukhobar Rd. #P  
Eugene, Oregon 97402  
Phone (503) 485-8575



BETSI is the new Interface/Motherboard from Forethought Products—the makers of KIMSI\*—which allows users of Commodore's PET Personal Computer to instantly work with the scores of memory and I/O boards developed for the S-100 (Imsa/Altair type) bus. BETSI is available from stock on a single 5 1/2" x 10" printed circuit card.



BETSI is available off-the-shelf from your local dealer or (if they're out) directly from the manufacturer.

Ask about our memory prices, too!

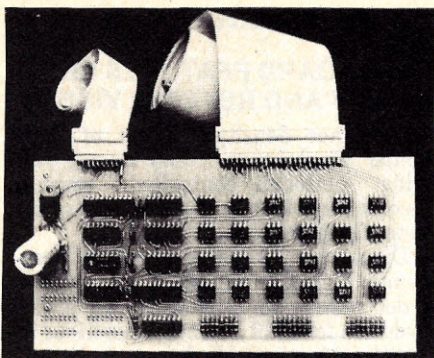
\*PET is a Commodore product.

© 1978 Forethought Products

CIRCLE 214 ON READER SERVICE CARD



## PERIPHERALS



### PET INTERFACE CARD

A new interface card for use on Commodore's PET computers as a process controller for medium duty applications, for stepper motor operated devices, has been developed by NANCO. The easy-to-install card makes it possible for a personal sized computer to fulfill a wide range of command tasks.

The two 4-phase stepper logic outputs are provided with eight opto-isolated sense input lines and eight opto-isolated output control lines.

A software driver module is included containing eight commands which facilitate control of two steppers, eight heavy duty relays or triacs, and eight input sense lines. All commands, which include rate select, stepper move, limit switch inputs, relay control, position index and execution command, are passed by the

user function in PET basic.

The software module occupies 400 bytes and will run on any 8K, or larger, computer.

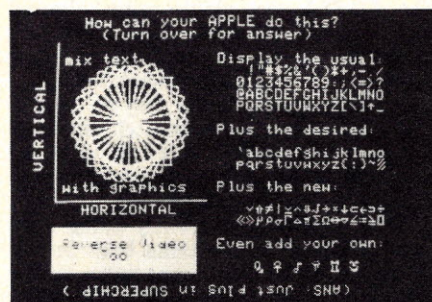
Power is supplied from computer transformer to onboard 5V regulator. Board dimensions are 4" x 8", and comes complete with mounting hardware, parallel user port and control cables. Three extra IC positions are provided for custom additions.

Options include: power control unit containing stepper power supplies, heavy duty relays, and I/O termination panel.

Suggested retail price is \$199.

NANCO Diversified Design, 8380 Vickers Street, Suite E, San Diego, CA 92111, (714) 565-2635.

### CIRCLE 251 ON READER SERVICE CARD



### NEW 'SUPERCHIP' FOR APPLE

A "Superchip" has been developed which substantially enhances the text processing capabilities of the popular Apple computer, according to Eclectic Corporation of Dallas which will market

the unit.

The ROM firmware chip, which plugs into an Apple computer with no modification required, adds the full ASCII character set, including lower case, plus 31 other useful, non-ASCII characters. It also greatly enhances editing capabilities for program and data modification. The chip is compatible with existing Apple programs the Integer BASIC and Applesoft.

Used in conjunction with a special character edit cassette, also from Eclectic, "Superchip" allows the user to define new characters in a magnified format. With this feature, it is possible to create entire character sets, such as foreign alphabets (Greek, Russian, Arabic), musical notation and game pieces. \$124.90.

Eclectic Corporation, 2830 Walnut Hill Lane, Dallas TX 75229. (214) 358-1307.

### CIRCLE 252 ON READER SERVICE CARD

### COMPUTALKER TRS-80 SPEECH SYNTHESIZER

COMPUTALKER CONSULTANTS announced the new Model CT-1T, a speech synthesizer adapted specifically for the Radio Shack TRS-80 micro-computer.

The Model CT-1T Speech Synthesizer is a completely self-contained unit. The interface circuit board contains an on-board 2 Watt audio amplifier, a S-100 connector for the CT-1 speech synthesizer board, and a Radio Shack compatible edge connector. An interconnect

Introducing—New, Low-cost, Fixed Vocabulary

# Speech Synthesizers

## for Computer Hobbyists or OEM use

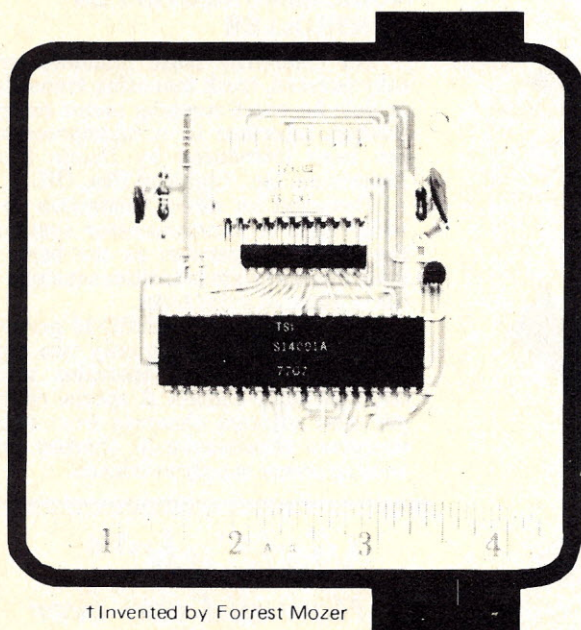
### FEATURES

- Two 64-word vocabularies available:
  - Full spoken numerics plus a variety of measurement words
  - ASCII characters: numerics, alphabet, punctuation
- Clear, highly intelligible male voice
- All MOS-LSI circuitry
- 6-bit parallel strobed input
- No external clocks required
- Inputs are TTL compatible
- Analog Speech output signal
- Custom vocabularies can be produced

**\$179<sup>00</sup>\***

Boards with numbers & calculator functions... only . . . . . \$95.00 \*

\*Plus state sales taxes where applicable



†Invented by Forrest Mozer



**TELESENSORY SYSTEMS, INC.**  
3408 Hillview Ave., P.O. Box 10099, Palo Alto, CA 94304  
Telephone (415) 493-2626

### CIRCLE 202 ON READER SERVICE CARD



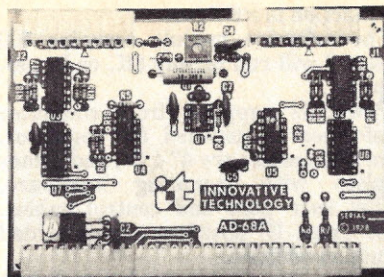
cable (supplied with the Model CT-1T) connects the unit to the TRS-80 bus connector on either keyboard or expansion interface. Standard phono jacks provide connections for external speakers, headphones or external amplifier (not provided).

The Model CT-1T Speech Synthesizer is a high quality voice generator designed to operate with the Radio Shack TRS-80 Microcomputer equipped with Level-II BASIC and a minimum of 16K RAM memory (32K recommended). The synthesizer is controlled by nine acoustic-phonetic parameters transmitted on the microcomputer bus.

The Model CT-1T can be operated in two modes: Direct Parameter Control; and Phonetic, and is supported by a growing library of software. Each unit is shipped with a hardware user manual, basic set of software consisting of CTEDIT Parameter Data Editor, and speech parameter data files HELLO, LETTERS, and DIGITS, and the COMPUTALKER CSR1 Synthesizer-by-Rule Software program. All software is available in choice of 5-1/4 inch diskette or standard cassette. Normally \$595 (limited introductory offer: \$495).

COMPUTALKER CONSULTANTS,  
1730 21st Street, Suite A, Santa Monica,  
CA 90404 (213) 392-5230.

CIRCLE 253 ON READER SERVICE CARD



## ANALOG TO DIGITAL CONVERTER

The AD-68A is an eight channel analog to digital converter which occupies one I/O slot in a SWTPC 6800 type computer. It allows the computer to measure analog signals from 0 to 2.50 volts with a resolution of 10 millivolts. The AD-68A uses single ramp, elapsed time method of conversion with the computer providing control and counting functions through a 30 byte subroutine.

Unused analog inputs may be used to sense logic signals and switch closures. Regulated +5 volts and +/-12 volts are available at the input connectors to provide power for external circuits.

The AD-68A is currently being used in a variety of applications both in and outside of the home (especially in the university and industrial laboratory environment).

The AD-68A comes with complete documentation including the driver subroutine, BASIC program example, and schematic. \$39.95 assembled and

tested.

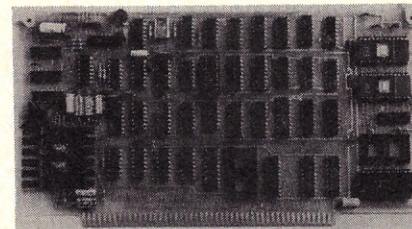
Innovative Technology, 510 Oxford  
Park, Garland TX 75043, 214-270-8393.

CIRCLE 254 ON READER SERVICE CARD

## VIDEO BOARD FEATURES HIGH DENSITY AND REVERSE VIDEO

A higher density version of their popular Flashwriter Video Board, featuring optionally-controlled reverse video, is the latest product line entry by Vector Graphic Inc.

Displaying 80 characters x 24 lines, the new FLASHWRITER II uses an 8 x 10 dot matrix to produce crisp, sharp resolution for 1920 character positions in a 2048 byte memory block.



In addition to normal video, reverse video is optionally controlled by the higher order bit of the character code. As many as 256 characters can be generated by 2708/2716 EPROMS which may be user-programmed for special symbols or graphic displays.

The FLASHWRITER II allows extremely rapid updating of the screen via memory-mapped I/O. Special circuitry prevents flashes on the screen when updating memory and a keyboard port with latched data provides easy interface to Vector Graphic's Mindless Terminal or other parallel keyboards. \$320.

Vector Graphic Inc., 31364 Via  
Colinas, Westlake Village, CA 91361,  
(213) 991-2302.

CIRCLE 255 ON READER SERVICE CARD

## NOISE IMMUNE STEPPER CONTROLLER

An inherently noise immune, optically isolated, track mounting translator module for exact stepping motor control through interface to a microprocessor has been introduced by Duane Elms Associates, Inc., Highland Hts., OH.

Designed for direct connection to a wide range of microprocessor systems, the MPSD-10 operates on the basis of input channel state transitions instead of the traditional pulse train.

The design of the MPSD-10 permits full step operation using only two logic signals and half step operation using only four logic signals. A special circuit prevents adjacent channels from being energized simultaneously, thereby preventing power supply overloads.

## NOW, FROM MOUNTAIN HARDWARE. THE 100,000 DAY CLOCK.™

### Put your S-100 Computer on the clock.

A real time clock could double the utility of your computer. Time events in 100 $\mu$ S increments for up to 100,000 days (over 273 years). Program events for the same period with real time interrupts that permit pre-programmed activities to take place...without derailing on-going programs. Maintain a log of computer usage. Call up lists or appointments.

Time and date printouts. Time events. An on-board battery keeps the clock running in the event of power outage.

Mountain Hardware also offers a complete line of peripheral products for many fine computers.



Available at your dealer's. Now.

**Mountain Hardware, Inc.**

300 Harvey West Blvd.  
Santa Cruz, CA 95060 (408) 429-8600

CIRCLE 181 ON READER SERVICE CARD

## VisiCalc™

*How did you ever  
do without it?*

CIRCLE 167 ON READER SERVICE CARD

CREATIVE COMPUTING

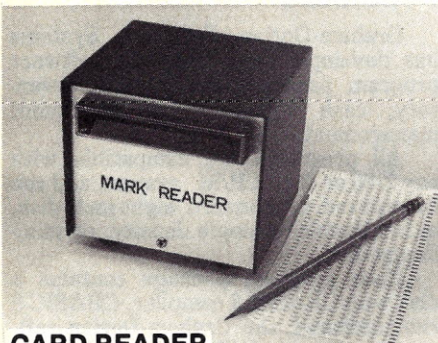


Each channel of the module can be easily driven from a single, ordinary gate of any common logic family.

With four phase drive outputs, rated at 10 amps per phase, the controller features the flexibility of using a wide range of off-the-shelf power supplies from 12V to 60V.

Duane Elms Associates, Inc., 341 Alpha Park, Highland Hts., OH 44143, (216) 473-1887.

CIRCLE 256 ON READER SERVICE CARD



## CARD READER

A mark sense card reader specifically designed for the microprocessor computer market has been announced by Chatsworth Data Corporation. The reader, designated the MR-500, is a hand-fed reader that measures 4 1/2 inches in all directions and weighs less than five pounds. All power required by the reader is derived from a U.L. approved AC to DC converter. The MR-500 accepts cards of variable length

marked with a standard number two pencil. The card data is converted to either ASCII or card image.

Special interfaces have been developed to allow the reader to be connected directly to the TRS-80, Apple II, and PET computers. \$750.

Chatsworth Data Corp., 20710 Lassen St., Chatsworth, CA 91311, (213) 341-9200.

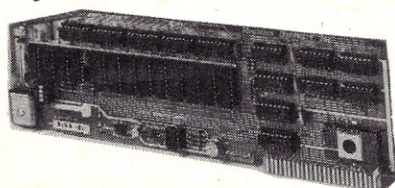
CIRCLE 257 ON READER SERVICE CARD

## APPLE CLOCK

Mountain Hardware announces the introduction of a Real-Time Calendar/Clock for Apple II computers.

The Apple Clock keeps time and date in lms increments continuously for over one year. Calendar, clock, and event timer functions are easily accessed from BASIC using routines carried in on-board ROM.

It's crystal controlled and has an on-board rechargeable battery to keep the Clock running during computer down times. Software for calendar and clock routines, as well as an event timer are contained in on-board ROM. An interrupt feature is provided which can be programmed to make efficient use of computer time.



Add the Apple Clock to Mountain Hardware's Introl Remote Control System for real-time control and monitoring of remote devices over regular AC wiring. \$199.

Mountain Hardware, Inc., 300 Harvey West Boulevard, Santa Cruz, CA 95060, (408) 429-8600.

CIRCLE 258 ON READER SERVICE CARD

# VENDOR LITERATURE

## NEW COMPONENTS CATALOG

Electronic components, test equipment, hardware and tools are listed with prices in a newly released, 104 page catalog.

The catalog, published by Mouser Electronics, contains over 10,000 items including expanded lines of capacitors, resistors, trimmer potentiometers, semiconductors, switches, transformers and test equipment. All of the products are very competitively priced.

For more information write or call for a free electronic components catalog as follows:

Catalog, Mouser Electronics, 11511 Woodside Ave., Lakeside, CA 92040, (714) 449-2229.

CIRCLE 259 ON READER SERVICE CARD



# HOBBY WORLD®

## S-100 COMPUTER BOARDS

|      |           |                                     |        |
|------|-----------|-------------------------------------|--------|
| 1601 | CCS/M-XVI | 16K STATIC RAM MODULE KIT           | \$275  |
| 1602 |           | as above, a&t                       |        |
| 1603 |           | as above, bareboard                 |        |
| 1500 | HUH/S-100 | MPA kit                             |        |
| 1503 | MH        | PROPROM, 8K EPROM BOARD             | \$214  |
| 1504 |           | 6834 EPROMs for above               | \$ 10  |
| 1505 | MH        | 100,000 DAY CLOCK, a&t              | \$219  |
| 1506 | MH        | INTROL, 64 chan remote control a&t  | \$329  |
| 1507 | WMC/QM1   | 12 SLOT MOTHERBOARD                 | \$ 39  |
| 1508 |           | as above, with connectors           | \$ 80  |
| 1509 | WMC/MEM1  | 8K STATIC RAM BOARD                 | \$ 28  |
| 1510 |           | parts only for above                | \$ 80  |
| 1403 | SSM/CB1   | 8080A CPU BOARD KIT                 | \$134  |
| 1406 | SSM/SB1   | MUSIC SYNTHESIZER KIT               | \$ 145 |
| 1411 | SSM/IO4   | 2 PARALLEL + 2 SERIAL PORTS KITS    | \$139  |
| 1414 | SSM/IO2   | IO UNIVERSAL BOARD KIT              | \$ 48  |
| 1417 | SSM/VB1B  | VIDEO INTERFACE KIT                 | \$129  |
| 1425 | SSM/MB3   | 2/4K EPROM BOARD KIT                | \$ 54  |
| 1420 | SSM/MB4   | 2 MHZ STATIC RAM KIT                | \$ 89  |
| 1427 | SSM       | ALTAR IMSAI EXTENDER BOARD          | \$ 10  |
| 1428 |           | connector for above                 | \$ 4   |
| 1429 | SSM/OB1   | VECTOR JUMP & PROTO-TYPING CARD KIT | \$ 47  |

CCS=California Computer Systems  
WMC=Wameco  
IA=Ithaca Audio  
SSM=Solid State Music  
SDS=SD Systems  
SPL=Speechlab  
HUH=HUH Electronics  
MH=Mountain Hardware  
a&t=assembled & tested

|           |          |                              |       |
|-----------|----------|------------------------------|-------|
| 1432      | SSM/MT1  | 15 SLOT MOTHERBOARD          | \$ 39 |
| 1433      | SSM/MB8A | 16K (2708) EPROM BOARD KIT   | \$ 88 |
| 1436      | SSM/MB9  | 4K STATIC PROM/RAM BOARD KIT | \$ 64 |
| 1438      | SSM/VB2  | VIDEO BOARD KIT              | \$139 |
| 1511      | IA       | 2708/2716 EPROM BARE-BOARD   | \$ 28 |
| 1512      | IA       | 280 CPU BAREBOARD            | \$ 32 |
| 1513      | IA       | 8K STATIC RAM BARE-BOARD     | \$ 28 |
| 1514      | IA       | S-100 WIREWRAP BOARD         | \$ 28 |
| 1600      | CCS      | S-100 WIREWRAP BOARD         | \$ 29 |
| 1516      | SDS      | VERSAFLOPPY KIT              | \$159 |
| 1517-0SDS |          | EXPANDORAM KIT               | \$185 |
| 1517-16   |          | as above, with 16K RAM       | \$249 |
| 1517-32   |          | as above, with 32K RAM       | \$330 |
| 1517-48   |          | as above, with 48K RAM       | \$425 |
| 1517-64   |          | as above, with 64K RAM       | \$500 |
| 1165      | NEWTECH  | MUSIC BOARD a&t              | \$ 57 |
| 1518      | SPL      | 32 WORD SPEECHLAB a&t        | \$189 |
| 1520      | SPL      | 64 WORD SPEECHLAB a&t        | \$299 |
| 1222      | uSOUNDER | SOUND EFFECTS BOARD a&t      | \$149 |

California Computer Systems

## MEMORY ADD-ON

16K \$80

For APPLE, TRS-80, EXIDY

Everything you need! Installs in minutes, no special tools, no soldering! 250 nsec. Cat No. 1156

## SHUGART SA-400 MINIFLOPPY DRIVE

\$275

Hard and soft sectoring, single density, 35 track. Requires power supply. Cat No. 1154

## 8" DISKS

• Single density

• IBM Compatible

\$40 box of 10

| Cat No. | Type                           |
|---------|--------------------------------|
| 1145    | 32 sector holes, 1 index hole  |
| 1146    | IBM 32, 3740, 3540, 3770, 3790 |

## VERBATIM 5 1/4" DISKETTES

\$29.95 box of 10

| Cat No. | Type          | Use           |
|---------|---------------|---------------|
| 1147    | Soft sector   | TRS-80, Apple |
| 1148    | Hard, 10 hole | North Star    |
| 1149    | Hard, 16 hole | Microdots     |

## LINEAR AND V.R. SALE!

order by type no.

|         |              |
|---------|--------------|
| 7805T   | 2 for \$1.50 |
| 7812T   | 2 for \$1.50 |
| 7815T   | 2 for \$1.50 |
| 7905T   | 2 for \$1.70 |
| 7912T   | 2 for \$1.70 |
| 7915T   | 2 for \$1.70 |
| LM308V  | 2 for \$1.30 |
| LM311N  | 2 for \$1.30 |
| LM324N  | 2 for \$1.20 |
| LM358N  | 2 for .85    |
| LM386N  | 2 for \$1.50 |
| LM389N  | 2 for \$2.00 |
| NE555V  | 4 for \$1.00 |
| LM556N  | 2 for \$1.50 |
| LM567V  | 2 for \$1.40 |
| LM703N  | 2 for .60    |
| LM723N  | 2 for .90    |
| LM1458N | 2 for .70    |
| LM1489N | 2 for \$2.00 |

MINIMUM ORDER \$10

Pay by check, COD, Visa, or MasterCard. Order by phone or mail. Please include phone no. USA add \$1.50 for shipping/handling, or \$2.50 for air. Foreign add \$2.00 for surface, \$5.00 for air. COD's add 85c. All items guaranteed satisfaction for 120 days!

## DATA CASSETTES 10 for \$17

Highest quality, leaderless! With protective plastic case. Cat No. 1142

## FREE CATALOG!

New, hot off the press! Top quality, low cost factory fresh IC's, leds, readouts, semis, computer add-ons, boards, test equipment, books, software, PC aids, and more!

## TRS-80 LEVEL III BASIC \$42

As advertised in March Interface. Loads on top of level II, turns your TRS-80 into a powerful system. Solves loading problems, cures keyboard "bounce". Software cassette, has the power of a hardware modification! Guaranteed satisfaction! Cat No. 1332

## COMPUCRUISE \$165

Navigational computer for mobile or marine use! Features cruise control, fuel management, trip computer, timer/counter. Warns low fuel! Compensates for tire size, converts to metric! 44 functions. Mounts easily on dash. Easy to read bright blue digits. With installation instructions. Cat No. 1166

## MICROPROCESSORS RAMS

Order by type no.

|           |         |
|-----------|---------|
| 8080A     | \$9.00  |
| 6800      | \$ 9.00 |
| Z-80A     | \$14.50 |
| 702A      | \$ 3.00 |
| 2708      | \$ 9.50 |
| 21102-250 | \$ 1.50 |
| 21102-450 | \$ 1.25 |
| 21102-650 | .90     |
| 2114-200  | \$10.50 |
| 2114-300  | \$ 9.50 |
| 2114-450  | \$ 8.50 |
| 4116      | \$11.00 |

19355 BUSINESS CTR DR. - 6C5 NORTHRIDGE, CA 91324



## SOFTWARE

### DATA MANAGEMENT SYSTEM FOR MICROCOMPUTERS

A data management software package for Z-80 based microcomputers, featuring a report generating and file definition capability, has been introduced by Vector Graphic Inc.

The CCA DATA MANAGEMENT SYSTEM operates in four phases: file definition, data input and maintenance, sorting and report generation. It includes a versatile data file utilization program accommodating over 1,000 records per file. In the maintenance phase, records may be added, deleted, updated or inspected. Records can also be searched for a specific item of data.

For report generation the package allows specification of fields to be sub-totaled or totaled, and permits selection of numeric field format, paper size and printing format. It produces mailing labels as well as documents, while the powerful sort package provides up to ten nested sorting levels.

CCA DMS runs under the MDOS operating system and Micropolis BASIC. A comprehensive user guide is also supplied. \$150.

Vector Graphic Inc., 31364 Via Colinas, Westlake Village, CA 91361, (213) 991-2302.

CIRCLE 265 ON READER SERVICE CARD

### CONDUIT SIMULATIONS

CONDUIT, a source of peer reviewed and technically verified computer-based instructional materials, has announced the availability of eleven packages for the Commodore PET 2001 microcomputer. These packages are primarily simulations that cover basic concepts in biology, chemistry and physics. The units are supplementary to regular classroom instruction and are intended to broaden the user's experience. Printed guides for students and instructors complement the computer programs in each package.

For more information about CONDUIT and how to order the available instructional units, write for a free copy of the CONDUIT magazine, Pipeline, to: CONDUIT, Creative Computing Offer, P.O. Box 388, Iowa City, IA 52240. (319) 353-5789.

CIRCLE 266 ON READER SERVICE CARD

### 6800 DEVELOPMENT SYSTEM

WINTEK's new DEVELOPMENT PAC II includes 48K RAM and an EROM programmer for \$1895. Also included is a RS-232 serial I/O port with switch selectable baud rates, 300 baud and 2400 baud cassette interfaces, an editor/assembler, and industrial BASIC, and all other items required to configure a 48K development system. WINTEK Corp., 902 N. 9th Street, Lafayette, IN 47904; (317) 742-6802.

CIRCLE 267 ON READER SERVICE CARD



### DETAILED SOFTWARE PROGRAMS

Graham-Dorian Software Systems has developed four complete software program packages for payroll, inventory, cash register, and apartment management.

All programs are compatible with any Z-80 or 8080 CP/M system, and can be ordered in standard eight-inch disk, either double or single density, or mini-floppy disk.

Each program package contains a disk with CBASIC-2 compiler, CBASIC-2 run command, the Graham-Dorian software program in INT and BAS file form, plus a user's manual and hard copy source listing.

The four programs sell for \$695.00 each. One CBASIC-2 is free with a program order; others cost \$89.95 each.

All packages are described in detail in a literature packet available free from Graham-Dorian Software Systems, 211 N. Broadway, Wichita, KS 67202, (316) 265-8633.

CIRCLE 268 ON READER SERVICE CARD

### Micro Business Software CMBS® by Computer Products of America

- Complete interactive, double entry accounting
- 46 programs with extensive software
- Written in Northstar BASIC (other variations available)
- General ledger, accounts receivable, accounts payable, inventory and payroll
- Three minidisks for transaction, data and maintenance
- Diskettes hold 500 customer listings, 800 vendors, 1500 line items of inventory, 500 employees, 125 general ledger accounts
- Only \$395.00

To order CMBS® business software, send check, money order or purchase order (Calif. residents add 6% sales tax—prepaid orders shipped at no charge) to:

**Computer Products Of America**  
A Division of The Computer Mart  
633 West Katella Avenue  
Orange, CA 92667  
(714) 633-1222

Dealer and OEM prices upon request

CIRCLE 154 ON READER SERVICE CARD

## TRS-80

SHUGART • PERTEC • MPI DISK DRIVES W/2  
DRIVE CONNECTOR CABLE, POWER SUPPLY AND  
CABINET (DRIVE O EQUIV.)

**\$399**

SHUGART • PERTEC • MPI DISK DRIVES W/POWER  
SUPPLY AND CABINET (DRIVE 1, 2, 3 EQUIV.)

**\$375**

16K of 200 ns NEC MEMORY for TRS-80  
KEYBOARD

**\$95**

16K of 200 ns NEC MEMORY FOR TRS-80  
EXPANSION INTERFACE

**\$93**

MASTERCARD • VISA • BANKAMERICARD  
ACCEPTED

FOR FAST SERVICE OR MORE INFORMATION, CALL  
(714) 893-2311

**AMS** ADVANCED  
MICROCOMPUTER  
SYSTEMS

13771 UNIVERSITY • WESTMINSTER, CA • 92683

CIRCLE 103 ON READER SERVICE CARD



## FREE GAMES FOR HOSPITALS

The PET GAZETTE (1929 Northport Dr., Room 6, Madison, WI 53704) would like to help you help others. Do you realize that you and your PET computer could cheer up lonely hospitalized children? To make it very easy for you to get started with this project, the PET GAZETTE is offering a package of 6 games absolutely FREE if requested by your city hospital's Volunteer Services Director on their letterhead. These games were chosen carefully so that children of all ages could enjoy them. Since the Master tape will be available at the hospital, you or any other PET owners will have easy access to these exciting games.

Play BLACKJACK with the PET. Cards are graphically displayed of course. SNAKE is one of the most popular games. Challenge a friend, play against the PET, or watch the PET play against itself with this real time version of Blockade. Younger children will enjoy STARS, a number guessing game, and TOMMY TERMITE. If you have a speaker/amplifier connected to your PET's user port pins M & N you can take advantage of the excellent sound effects in CHASE and HANGMAN. Children (and adults) of all ages love this real time robot chase game. Besides being fun, HANGMAN is educational.

Request CHILDREN/HOSPITAL GAMES. The PET GAZETTE is looking for other worthy projects for PET users. Please send your ideas attention Len Lindsay.

Microcomputer Resource Center, Inc., 1929 Northport Dr., Room 6, Madison, WI 53704.

CIRCLE 269 ON READER SERVICE CARD

## BUSINESS SOFTWARE

UNIVAIR INC. is proud to announce the availability of a new line of 21 fully integrated and auto-chaining business software packages.

Some of the major programs include General Ledger, Accounts Payable, Accounts Receivable, Payroll, Inventory, Dental Management System, Medical Management System, Real Estate Multi-List, Insurance Agency, Credit Union, Data Base Management, Word Processing, and many others. All programs run under C/PM or IMDOS with Commercial Basic and 31K of RAM total.

A unique system of automatic chaining, posting, and file backups and updates are incorporated which allow a secretary with no previous experience to use the system.

Cost of each program on 8" IBM Disk is \$395, and complete source code and operators manuals are provided. Programs are also available on 5" North Star or 5" Micropolis Disks.

Univair Inc., 10327 Lambert Intl. Airport, St. Louis, MO 63145, (314) 426-1099.

CIRCLE 270 ON READER SERVICE CARD

## SPEAKEASY SOFTWARE

Speakeasy Software announces the availability of its consumer-oriented software for the PET and the TRS-80, in addition to its best-selling APPLE versions. The titles fall into two categories: The Continuing Education Series, which includes Financial Analysis and Transactional Analysis; and, the Home Entertainment Series, with the popular WARLORDS, BULLS AND BEARS, SPORTSTRIVIA, MICROTRIVIA and KIDSTUFF. These professionally-packaged products are sold exclusively through computer stores and are available from the leading distributors of microcomputer products worldwide.

Speakeasy Software Ltd., Box 1220, Kemptville, Ontario, Canada K0G 1J0 1-613-158-2451,

CIRCLE 271 ON READER SERVICE CARD

## SMITHWARE FOR YOUR PET

SMITHWARE Division of Smith Business Services, has released their Personal Accounting System (PAS) which relies heavily on the PET's cassette data file capabilities to generate and validate files containing a detailed description of your financial transactions. Designed specifically to use your check register as the data source, PAS consists of six programs including those to generate and edit data files, balance your checkbook, reconcile your bank statement, report your outstanding checks, and summarize your transactions over a period of time. PAS creates three cassette files—monthly transactions, outstanding checks and summary. \$16.

Smith Business Services, P.O. Box 1125, Reseda CA 91335.

CIRCLE 272 ON READER SERVICE CARD

# TRS-80 PERIPHERALS & SUPPLIES

**DISK DRIVES**  
**\$399.00**

Fully compatible with Radio Shack drives. Includes: ■ Power supply ■ case (specify silver or blue) ■ 4 drive connector cable ■ verbatim diskette with test program and user op. system ■ 60 day warranty ■ complete user instructions.

**16K RAM SETS**  
**\$106.00**

200NS 16K Dynamic RAM Memory Kit. NEC chips. Includes jumpers and instructions for installing in TRS-80 keyboard unit or expansion interface. (Specify keyboard or interface.)

**VERBATIM  
DISKETTES**  
**\$3.30 ea.**  
**10 FOR \$30.00**

These are the top of the line in diskettes and worth every cent of the \$6.00 each that you pay elsewhere.

**CENTRONICS-779  
LINE PRINTER**  
**\$1200.00**

With forms tractor. This is the same printer that Radio Shack supplies. A \$399.00 savings if you buy from us.

**TI-810 PRINTER**  
**\$1995.00**

All set to run on your TRS-80 at twice the speed of the 779.

Send to P.P.S.

P.O. Box 2051, Seal Beach, California 90740

For fast service or information call (714) 894-3736

CIRCLE 190 ON READER SERVICE CARD



## REAL ESTATE INVESTMENT PROGRAM

An investment analysis program well suited to real estate investments is available for use in the Commodore PET personal microcomputer. It can be used by investors, business men, real estate salesmen, educators, and students to assist in understanding and making sound investment decisions. The program makes this possible by analyzing the effects of financing, taxation, depreciation, inflation, and other parameters. It models an investment by computing quantities projected into future years while considering the effects of taxes and inflation. Information is conveniently displayed on the PET to permit the effects of changes of individual inputs to be evaluated interactively and aid in optimizing investment yield.

The program accepts initial inputs using a question and answer protocol. When all answers for the investment that is tailored to the tax situation of the investor have been computed and displayed, it then presents inputs again for possible changes using a menu type protocol.

Titled REAL-I and written in BASIC, the program comes complete with software on cassette and an operating manual. \$29.

Applications Research Co., 13460 Robleda Rd., Los Altos Hills, CA 94022.

CIRCLE 260 ON READER SERVICE CARD

## ACT-I SOFTWARE HOME MONEY MANAGEMENT SYSTEM

The Programming Shop, a computer software house, is happy to announce the personal computer software that will make money management easier in the home.

The system saves time and gives budget control to the user. All past money transactions for the current year are stored on a personal data base. Weekly, monthly and annual balances are displayed on a video screen for income, payments, taxes, and interest.

The ACT-I Software takes the work and worry out of keeping track of your money flow. Accurate projections tell the user when he can spend wisely and avoid spending when the budget is already committed to its limit. The ACT-I Software tells you where you are spending your money and keeps track of your deposits as well as withdrawals from your savings account. The current system is now available to Radio Shack TRS-80 users; 16K, Level-II.

The system documentation includes a glossary, system overview, detailed operating instructions for the first time computer user, and information for the tinkerer who likes to go into the code and put in his own personal touch. \$79.90.

The Programming Shop, P.O. Box 11219, Palo Alto, CA 94306, (415) 321-9621.

CIRCLE 261 ON READER SERVICE CARD

## SOURCE LISTINGS FOR DISK BASIC ETC INTERPRETER

Binary Systems Corporation announced that the company is offering the complete source listing of Disk BASIC Etc., a BASIC language interpreter.

Purchasers of Disk BASIC Etc also receive a 48-page language manual, and a 50-page instruction manual for modifying or adding routines.

Wilson said the 6000-line source listing, together with the two manuals, give owners of Z-80 and 8080-based machines the tools to equip their system with a comprehensive BASIC interpreter that may include user-defined command and I/O routines.

He said a user can add as many as five custom commands without reassembling the program.

Disk BASIC Etc is a general purpose BASIC suitable for both business and scientific applications. The interpreter was written by the co-authors of the original Tiny BASIC, and BASIC Etc, the predecessors of Disk BASIC Etc.

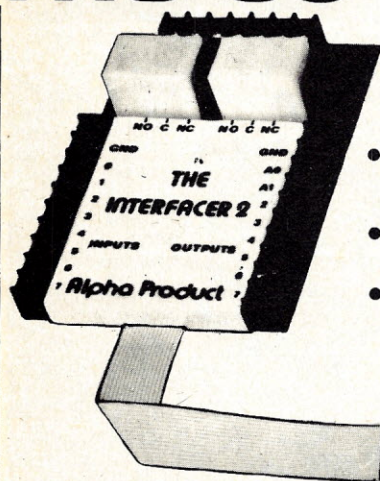
Disk BASIC Etc provides integer functions such as ASC(II), POS(ition), SEARCH, and USR; and, a full complement of floating-point math functions, such as ATAN, FLT, SIN and VAL. \$100.

Micro Store, 634 S. Central Expressway, Richardson, TX 75080.

CIRCLE 262 ON READER SERVICE CARD

## TRS-80

### OWNERS



- CONTROL APPLIANCES, OPERATE MOTORS, SOLENOIDS, DRIVE LED'S, SOUNDING DEVICES.
- SENSE SWITCH CLOSURE, PHOTOSENSORS AND LOGIC LEVELS.
- APPLICATIONS INCLUDE: TELEPHONE DIALER, REMOTE CONTROL, EXTERNAL KEYBOARDS, ALARM, DIGITAL LOCK AND MORE.

CONNECTS DIRECTLY INTO KEYBOARD OR INTERFACE

The 'Interfacer 2' plugs into the rear of your TRS-80 keyboard or expansion interface. Level II Basic statements (INP & OUT) control 8 inputs and 8 outputs. Two outputs are SPDT relays, more relays can be added. The inputs will accept contact closure or TTL logic. Detailed instructions show you how to connect to a variety of devices. Programs, diagrams and explanations are included so you can start using the 'Interfacer 2' immediately.

The 'Interfacer 2' comes completely assembled, tested and ready to use with power supply, connector cable and User's Manual. Level II Basic is required.

#### ORDERING INFORMATION

Price \$85.00—Please add \$3.00 for shipping and handling. N.Y. residents add 8% sales tax. Dealer inquiries invited.

**ALPHA** product company

85-71, 79th ST., WOODHAVEN, N.Y. 11421 (212) 296-5916

CIRCLE 105 ON READER SERVICE CARD

## STARFLEET ORION



A specially designed SF TACTICAL BATTLE GAME for your PET, TRS-80 or APPLE Computer.

The man called Sudden Smith watched the five blips on his screen spread out to meet the enemy. Two freighters converted into something like battlewagons, powerful but slow, and three real cruisers: the most powerful group of warships ever seen near the Promethean system — except for the Stellar Union fleet opposing them. Everyone was calling it Starfleet Orion, though it existed for only this day. It was life or death, and, after the object lesson on the planet Spring, everyone knew it.

STARFLEET ORION is a complete game system

- rule book
- battle manual
- cassette
- ship control sheets
- program listings

Includes 2 programs, 22 space ship types, and 12 playtested scenarios. Game mechanics are extremely simple, but play is exciting, challenging, and rich in detail. Specify PET (8K) or TRS-80 (level II, 16 K) (\$16.95) - or APPLE II, 24K version (\$18.95 including color and sound).

Ask your local dealer or send your check to:

Automated Simulations  
Department R  
P.O. Box 4232  
Mountain View, CA. 94040

California residents please add 6% sales tax

CIRCLE 209 ON READER SERVICE CARD

CREATIVE COMPUTING



## TSC BASIC FOR THE 6800

Technical Systems Consultants, Inc. announced the availability of the TSC BASIC for the 6800. The program resides in 9.5K of memory and is currently the fastest floating point BASIC interpreter available for any 8 bit micro. All of the standard BASIC statements and functions are supported as well as many extended capabilities. Both floating point and string variables are provided with strings being fully dynamic or unrestricted in size. Variable names may be either the standard types or double letter combinations allowing limited variable name mnemonics.

Other features include single and double dimensioned arrays. Array references support subscripts of 0 unlike several other 6800 BASIC's available. Array size, loop nesting, subroutine nesting and string length are only limited by the amount of user memory available in the machine. A tremendous enhancement is provided by the 'IF..THEN..ELSE' construct. The 'ELSE' clause promotes a more structured type programming style, thus improving readability and conciseness of the program. The input buffer allows lines as long as 127 characters to be entered to take advantage of the complex statement structures permitted with this statement. Other features include the HEX function which allows hexadecimal number representation while PI provides an easy reference to this often used constant. The floating point arith-

metic done by BASIC is performed to seven digits accuracy internally, with all answers printed to six. The dynamic range of the numbers is in the range of 10 raised to the plus or minus 37th power.

Overall, TSC BASIC is a fast and powerful BASIC. It is easily adapted to run in any 6800 system having at least 12K of user RAM available from location 0000. A system with 16K or more of memory is recommended for serious applications. The BASIC is available on Kansas City Standard cassette along with a complete user's manual for \$39.95.

Technical Systems Consultants, Inc., Box 2574, West Lafayette, IN 47906, (317) 463-2502.

CIRCLE 263 ON READER SERVICE CARD

## INVENTORY CONTROL SYSTEM

Taranto and Associates has available an inventory control system for the TRS-80. The Inventory Control System (ICS) comes in two versions. The first version maintains an inventory of rolls of carpet. The second version maintains an inventory which may consist of up to twenty sizes for each unique color and/or style.

The system makes use of a random processing method whereby each item in the inventory is immediately accessible. The main feature of the system is that accessibility is based upon an alphabetical style and color and is not dependent on the use of numeric item designations.

The file capacity with two mini-disks, 32K RAM; 492 items; with three mini-disks, 48K RAM; 991 items. Version I has 32K units per item and version II has 32K units per size, 20 sizes per item.

The functions of ICS include the maintenance of an inventory of various kinds of merchandise, with the additions of items to the inventory, the posting of changes in quantity for sales for additions to stock, and the removal of items from the inventory.

An inquiry can be made into the status of any item in the inventory. An inventory report listing the status of the item in the inventory can be made at any time.

Reports of additions to the inventory, deletions from the inventory and changes in quantities as documentation for all transactions affecting the inventory file. \$99.95.

Taranto & Associates, P.O. Box 6073, San Rafael, CA 94903, (415) 472-1415.

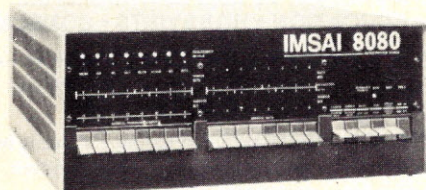
CIRCLE 264 ON READER SERVICE CARD

## MULTI-USER BASIC

Cromemco's new Multi-User Software can permit up to seven users to independently run BASIC programs. The introduction of the Multi-User capability for Cromemco Microcomputers provides an efficient, low-cost alternative to traditional time-sharing systems.

The operating system which controls the computer is similar to Cromemco CDOS. When a user logs on, the operating system finds an empty bank of

# Bits Bytes Books Bargains



**IMSAI • Cromemco • SWTPC •  
Lear-Siegler • Problem Solvers •  
RCA • North Star • Verbatim •  
ALPHA Micro Systems and others**

Fast, off the shelf delivery.  
Give us a call TOLL FREE  
800/523-5355

**MARKETLINE SYSTEMS, Inc.**

2337 Philmont Ave., Huntingdon Valley, Pa. 19006  
215/947-6670 • 800/523-5355

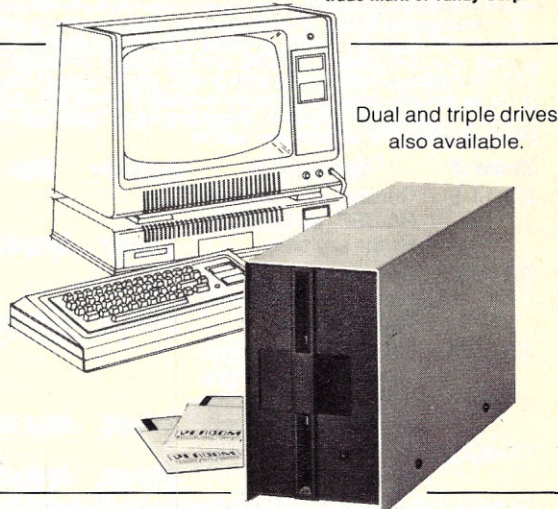
Dealer Inquiries Invited

CIRCLE 137 ON READER SERVICE CARD

# NOW...

## Add-on Mini-Disc for the TRS-80\*

\* trade mark of Tandy Corp.



Dual and triple drives  
also available.

only  
**\$399<sup>00</sup>**

Requires 16K RAM,  
Level II BASIC and  
Expansion Interface.

from

# PERCOM

PERCOM DATA COMPANY, INC.  
DEPT. C • 318 BARNES • GARLAND, TEXAS 75042  
Phone: (214) 272-3421 or  
Call toll free: 1-800-527-1592

CIRCLE 155 ON READER SERVICE CARD



memory and then puts the user into the Active Queue.

Console input and output are serviced by means of interrupts. When a user pushes a key on the keyboard, the current progress in execution in interrupted long enough for the operating system to get the user's character and put it into his console buffer. Console output is handled in a similar manner.

Another function of the operating system is to coordinate requests for input and output from the disks. When a user makes a request, it is placed into the Disk I/O Queue and the user is blocked until the request has been serviced. The requests in the Disk Queue are ordered by disk and track. This minimizes the motion of the disk heads required to service the users. The use of high performance floppy disk drives, which incorporate voice coil techniques, also permits extremely fast seeks.

The BASIC includes some important new features, such as: deadlock prevention and mutual exclusion features; an in-line BASIC text editor; long variable, label, and subroutine names of up to 31 characters; a PROTECT statement which can be used to insure that a file cannot be read, written, or erased; IF...THEN DO...ELSE...ENDDO; COMMON for linking BASIC programs; LVAR which lists the variables, functions, and label names of the program together with their current values; and NOLIST and DELREM which can be used to protect proprietary SAVED

programs.

Multi-User BASIC is supplied as software only or as a combination hardware/software package to upgrade a Cromemco System Two or System Three to a two-user system.

The package includes three 16KZ-W memory cards with Bank Select, one TRT-W interface, TU-ART cable, priority interrupt cable, software on diskette and documentation. The hardware/software package with 5" diskette (Model MUB-S) or 8" diskette (Model MUB-L) is available for \$2895. The Multi-User BASIC software alone is available on 5" diskette (Model FDB-S) or 8" diskette (Model FDM-L) for \$800.

Cromemco, Inc., 280 Bernardo Ave., Mountain View, CA 94043, (415) 964-7400.

CIRCLE 265 ON READER SERVICE CARD

## WORD PROCESSING PACKAGE

A word processing software system, designed exclusively for the Vector MZ small business microcomputer, has been developed by Vector Graphic Inc.

The Word Management System (WMS) runs on the company's MZ with internal 32K or 48K RAM memory boards, an appropriately modified 64 x 16 Flashwriter board and two special PROMS on a 12K PROM/RAM board. The configuration requires a video terminal and high-speed, bi-directional typewriter-quality printer as well.

System software incorporates sophisticated automated typing and editing capabilities including preparation of all

printed documents. It also features video display and instant memorization of text to facilitate interactive operation.

WMS allows modification without retyping, storage on magnetic diskette and immediate retrieval to enter changes. Text drafts may be printed at any time and users can then modify and reprint in any quantity. The system is also designed to use non-technical vocabulary. \$450.

Vector Graphic Inc., 31364 Via Colinas, Westlake Village, CA 91361, (213) 991-2302.

CIRCLE 266 ON READER SERVICE CARD

## CP/M FOR CDOS USERS

EXPAND your CP/M system to be compatible with most of Cromemco CDOS version 00.02 with the addition of new system calls not available under CP/M version 1.4. For Cromemco users, allows running of Cromemco software (Assembler, FORTRAN, Word Processing, DBMS, etc.) under CP/M. Together with our CBIOS for the 4FDC controller, (\$50 on 5 or 8" disk) you can run a fully compatible expanded CP/M. Supplied on 5 or 8 inch disk with manual for \$95. Specify system configuration and memory size when ordering. VISA and MC accepted for slight surcharge.

MICAH, Box 22212, SF CA 94122, (415) 664-0778.

CIRCLE 267 ON READER SERVICE CARD



SAT TRAK INTERNATIONAL

- TRACK SATELLITES ANYWHERE
- ACQUIRE VISUALLY AT NIGHT
- PREDICT FUTURE SIGHTINGS

APPLE SORCERER TRS-80

An international group of professionals offers ready-to-use software for beginners, professionals or schools to allow you to operate your own SPACE CENTRE and SATELLITE TRACKING SITE. The package includes cassette or disk, information on how to obtain and use orbital parameters available from NASA, and complete operating instructions. Programs listed below are in BASIC. FORTRAN is available on request.

| Order #  | Description  | Cassette | Disk    |
|----------|--|----------|---------|
| STI-11-E | Generates satellite RA/DEC or Lat/Long/Ht for any time.                            | \$12.95  | \$16.95 |
| STI-21-L | Generates azimuth/elevation/time for visual sighting.                              | \$15.95  | \$19.95 |
| STI-30-A | Updates current satellite parameters from observation time for future calculation. | \$12.95  | \$16.95 |
| STI-900  | All three on one medium.   | \$29.95  | \$39.95 |

Shipping free except \$2.50 US outside North America

Send cheque/money order to:  
**SAT TRAK International**  
 c/o Computerland of Colorado Springs  
 4543 Templeton Gap Road  
 Colorado Springs CO USA 80909  
 Colorado residents add 5% sales tax.

©1979 SAT TRAK

CIRCLE 192 ON READER SERVICE CARD

## The Full Service Computer Department Store...

# ComputerLand®

Serving The Small Computer Users  
 From the Novice - To The Pro In All Markets  
**BUSINESS • EDUCATION • HOBBYISTS • CONSUMERS**

**A COMPUTER FOR BUSINESS** starting at \$6000 can do inventory control, accounts payable & receivable, word processing, personnel records and MORE!

**A COMPUTER FOR THE HOME** can balance a family budget schedule appointments, do income taxes, tutor children, work appliances, and more...starting at \$350.

Products Available from over 70 leading Computer Co's. such as...

Apple  
Centronics  
Cromemco  
Diablo  
Dynabyte

Pet  
Hazeltine  
Micropolis  
North Star  
and others..



and other financing

### Additional Services Available

Programming Classes  
 Maintenance Contracts  
 Complete Computer Supplies  
 Consultants for Manufacturing and Business

Many Computers On Display In Our Store  
 Mr. Bill McNamara - President.  
 Has 15 years extensive experience with I.B.M.

Check our store hours OR for appointment call:

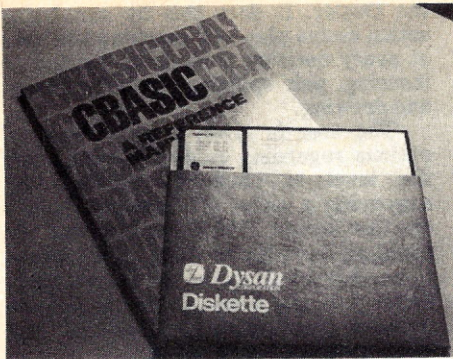
35 Plaza • Route 4 West  
 Paramus, N.J. 07652

845-9303

Just before the Rt. 17 Overpass

CIRCLE 128 ON READER SERVICE CARD





## CBASIC 2

Version 2 of CBASIC has been announced by Software Systems, P.O. Box 145, Sierra Madre, CA 91024. CBASIC is a comprehensive commercially oriented compiler/interpreter designed for use with the CP/M operating system.

CBASIC-2 improves on the original version by adding INTEGER VARIABLES, chaining with common variables, multiple line functions, and a Cross Reference Lister for program variables. Intermediate files are smaller and execution is faster.

CBASIC provides application programmers with a tool for developing large systems. Its emphasis on modular design, maintainability, expanded control structures and source code security.

CIRCLE 268 ON READER SERVICE CARD

## ESCROW BUSINESS ADMINISTRATION SYSTEMS

AIC announced today the release of a new Escrow Business Administration (EBA) System designed to significantly reduce the administrative costs and problems which exist in many California escrow and real estate offices.

This new system will greatly speed up the processing of escrow transactions, simplify the closing process, and provide better overall control of an escrow office's dollars and documents. The same system can also eliminate the need for separate and costly word processing machines.

Designed specifically to overcome the limitations and drawbacks of the computerized escrow processing services previously provided by some commercial banks, the EBA provides much faster closing times and with a greatly reduced error rate.

The EBA System consists of a micro-computer mounted in an attractive desk, a television-like video display terminal, a high-speed printer, and a package of computer programs which took ten months to develop. The memory of this system is provided by economical "floppy diskettes", each of which can hold hundreds of checks, receipts, and other records. The video terminal allows viewing and correction of escrow information at speeds up to 960 characters per second (cps). One of the two standard printers provides typewriter-quality reports and letter-perfect documents at 55 cps. A 120 cps matrix printer is also available.

The EBA recently completed months of field testing in a major Los Angeles escrow office and is now in production use. Multiple input terminals have been added at that location to accommodate several operators at one time.

The EBA can be either purchased or leased. The lease costs of the four EBA models range as low as \$2.36 to \$2.87 per hour on a 40 hour work week basis.

AIC is a Fountain Valley computer systems company. It also produces a wide variety of related business systems, such as General Ledger, which operate on the same equipment. The corporation is developing a major property and rental management system which will be available in ninety days.

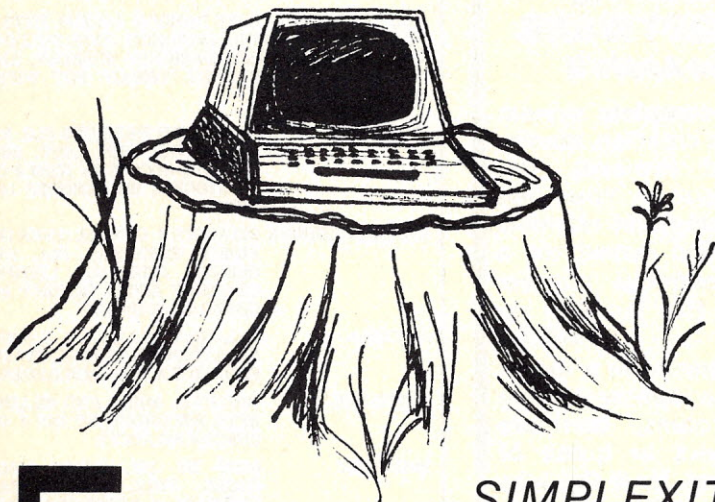
Adventures In Computing, Inc., 8756 Warner Avenue, Fountain Valley, CA 92708.

CIRCLE 269 ON READER SERVICE CARD

## ROM SOFTWARE LIBRARY ENHANCES PROGRAMMING CAPABILITIES

Apple Computer, Inc., has announced the Programmer's Aid #1, first of a series of software packages designed to improve and amplify user BASIC programming techniques.

The Programmer's Aid Package is a ROM (read only memory) based library of routines whose capabilities include high resolution graphics, program re-numbering and linking, tape verification, tone generation, RAM testing and machine language program relocation.



## STUMPED?

because you can't  
find the software  
you need?

## SIMPLEXITY'S GOT THE SOLUTION

in a wide assortment of useable software for the TRS-80, Exidy Sorcerer, Apple II and Commodore Pet. Simplicity software is fully documented and ready to use at home, at school or at work. Call us for the answers to your software problems.



**SIMPLEXITY  
SOFTWARE  
SYSTEMS**

P.O. BOX 501 HIRAM, OHIO 44234  
PHONE: (216) 568-7553

*Dealer Inquiries Invited*

CIRCLE 206 ON READER SERVICE CARD



Built-in high-resolution graphics programs allow a user to draw from any one of 53,000 locations on the screen, thereby providing capabilities for creating detailed graphs, smooth curves and other fineline figures. These pinpoint locations can appear in one of four colors: black, white, green or violet.

A dynamic RAM tester simplifies memory expansion by testing the new memory devices and precisely identifying any defective units.

Using a note table stored in memory, the Applelodeon synthesizes musical tones in five timbres spanning four octaves. This routine converts the Apple II into a unique, programmable musical instrument.

The RENUMBER routine relieves the user from the time and trouble involved in line renumbering. It changes line numbers for all or part of a program, starting at any point and using any user specified line number increment.

Program linking is another task that can be troublesome for the user. The Programmer's Aid package features an APPEND routine which loads a new program into memory along with whatever program is currently there.

A VERIFY routine may be used to assure the user that the program has been properly saved on tape before the existing version is erased from memory. \$50.

Apple Computer, Inc., 10260 Bandley Dr., Cupertino, CA 95014.

CIRCLE 270 ON READER SERVICE CARD

## brahman diversion

ANNOUNCES TWO GREAT  
SCRAMBLEDEGGS CONTESTS.

CONTEST 1: TO BE PLAYED AT OUR  
BOOTH AT THE COMPUTER FAIRE  
IN SAN FRANCISCO, MAY 9-11.

CONTEST 2: TO BE PLAYED AT YOUR  
LOCAL COMPUTER STORE ON  
SATURDAY, JUNE 2.

COME PLAY SCRAMBLEDEGGS AND  
**WIN!**

AND REMEMBER brahman diversion  
FOR QUALITY SOFTWARE ON  
DISKETTE FOR THE APPLE II.

P.S: IF YOUR LOCAL DEALER  
DOES NOT YET CARRY SOFTWARE  
FROM brahman diversion  
HAVE THEM WRITE TO:

brahman diversion  
BOX 1175  
MT. VIEW, CAL. 94042

CIRCLE 110 ON READER SERVICE CARD

## BRITAIN BREAKS PET SOFTWARE PRICE BARRIER

Storekeepers and operators of small businesses throughout the USA will soon be able to benefit from an extensive range of off-the-shelf software developed for the Commodore Pet personal computer in Britain by Petsoft.

The Company, now the largest micro software house in Europe, has a current catalogue of more than 150 tried and tested programs selling in the UK from \$6 to \$100. All the programs are held on standard C12 cassettes and are available off-the-shelf. A specialist software house, Petsoft is a subsidiary of Britain's leading independent computer bureau group, Applied Computer Techniques Limited.

Among the Petsoft routines accounts; forecast; sales analysis 3; and percentage costing.

Applied Computer Techniques Limited, Petsoft Division, 5/6 Vicarage Road, Edgbaston, Birmingham B15 3ES, 021-454-5348.

## A PRACTICE AND TUTORIAL PROGRAM FOR WINNING BLACKJACK

Discovery Bay Software Co. has developed a practice and tutorial program for winning casino blackjack. WIN21, written in BASIC for Radio Shack's TRS-80 (16K Level-II), drills the user in any of four different strategies from Edward O. Thorp's bestseller, Beat

the Dealer. It does this by simulating actual casino play and coaching the user at every decision point from betting to insuring, pair splitting, doubling down, and drawing.

The user is given a wide range of options regarding rules variations and the level of coaching received. By answering a series of questions flashed on the screen, the program can be configured to play by itself, give instructions, correct mistakes, or ignore them entirely. It also keeps a running score to indicate the user's mastery of the strategy being practiced. \$29.

WIN21 is available on cassette and comes with a copy of Beat the Dealer and a user's manual tying the program to the book through a series of lessons.

Discovery Bay Software Co., P.O. Box 464, Port Townsend, WA 98368.

CIRCLE 272 ON READER SERVICE CARD

## SOLID STATE & HOBBY CIRCUITS MANUAL

\$1.95 postpaid to your door. The new manual offers over 400 pages of circuits for the hobbyist, engineer, experimenter and do-it-yourself kit builder. HURRY — Supply limited. Free catalog. Frazer & Associates, 1888 Century Park East Suite 10, Century City, Calif. 90067

CIRCLE 150 ON READER SERVICE CARD

## Introducing HDS SOFTWARE For the Apple II

HDS-1 Our **complete** system for database creation, manipulation and retrieval. Machine language routines allow lightning-fast retrieval of information based on a virtually unlimited number of criteria. Fits in 16K. requires DOS ..... \$100.00

HDS-2 Adventure in a maze! You search a monster-ridden maze of rooms, corridors and chambers in quest of magical items (and the way out!)

16K tape version .... \$15.00  
32K DOS version .... \$30.00

MUCH MORE! Send for free catalog. Send your check plus \$1.00 shipping and handling per order (Calif. residents add 6% sales tax) to:

**Holistic Data Systems, Inc.**  
2210 Wilshire Blvd.  
Suite 446  
Santa Monica, CA 90403  
(213) 450-6192

CIRCLE 118 ON READER SERVICE CARD

## \*\*\*\* TRS 80 DISK BASED BUSINESS SOFTWARE \*\*\*\*

ALL PACKAGES UTILIZE RANDOM ACCESS. EXTENSIVE ERROR TRAPPING, EFFICIENT CODE, FOLLOW-UP ASSISTANCE, USER DESIGNED SCREENS, AND MUCH MORE. WE'RE NOT "CHEAP" BUT WE'RE DE-BUGGED.

|                |   |
|----------------|---|
| INVENTORY      | REPORTING INCLUDES SLS, REORDER, OIH, VEN, COST, REC. RANDOM ACCESS BY ITEM # OR BY STOCK #. 100 VENDORS 1400 ITEMS.        |
| GENERAL LEDGER | 200 ACCTS + CONTRA (USER DEFINED). TRAIL BAL, P&L, BAL SHEET, JOURNAL LISTING, CHART OF ACCTS. DOESN'T ACCEPT O/B JOURNALS. |
| PAYROLL        | SAL/HRLY INS DED + 2 MISC. FULL REPORTING FICA, STATE, FED, F.U.T.A. 80 + EMPLOYEES.  |
| ACCTS REC      | BAL FWD, AGING AND BILLING RPTS. RECORDED BY INV # OR CHECK #. 300 ACCTS.   |
| MAIL/LIST      | SORT BY ZIP, NAME, USER CODES. FULL OR PARTIAL PRINTING. 4 LINES N/A. SUP. PORTS 900.                                       |
| GAMES PACK     | 6 GAMES INCLUDING 80-OUT (BREAKOUT). DISK OR TAPE. TAPE (16K LEVEL 2) DISK (32K RAM)  |

WHOOPS I'M RUNNING OUT OF ROOM  
PRICES: INVEN, G.L., PAYROLL, A/R \$265.00  
MAIL/LIST \$79.95 GAMES PACK \$39.95  
ALSO AVAILABLE JOB COSTING\* PAYABLES, AND CUSTOM APPLICATIONS AND FREE UP TO DATE INFORMATION ABOUT NEW AND FUTURE TRS-80 PRODUCTS.

**AFFORDABLE BUSINESS SYSTEMS INC.**  
2101 E. BROADWAY RD., SUITE NO. 11  
TEMPE, AZ 85282 TEL.: 602-966-3339

SPEND A DIME AND CALL FOR MORE INFORMATION

CIRCLE 164 ON READER SERVICE CARD  
CREATIVE COMPUTING

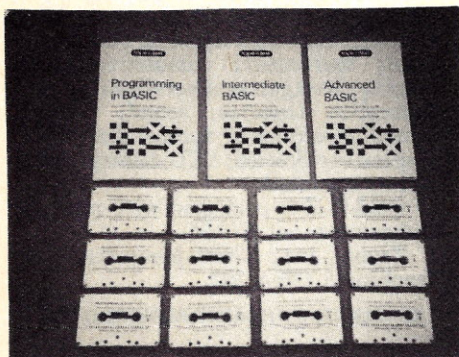


## TUTORIAL LANGUAGE FOR APPLE

VILLANOVA COLLEGE, a high school in Brisbane, Australia, announces the availability of a new, special purpose language for the APPLE-II. The language, called PETAL, enables a teacher to write simple tutorial lessons much more easily than he could in a general purpose language like BASIC or PASCAL.

Keywords in the language include QUESTION, ANSWER, MATCH and EXPLANATION. Commands include LIST, RUN, LOAD and SAVE. The package includes a unique screen-editor and is available only through dealers who are invited to send \$10 for an information package which includes a demonstration diskette.

## LEARNING AIDS



### BASIC PROGRAMMING COURSE

A new BASIC language programming course, consisting of 12 cassette tapes coordinated with 12 printed texts, is available from Williamsville Publishing Company.

The tape and text course is intended for the microcomputer hobbyist, the small business computer user and students enrolled in courses that require proficient use of the language. The author has over 18 years of teaching experience and he incorporates good teaching techniques in the presentation.

This BASIC tape 'n' text course is divided into three modules: **Programming in BASIC**, **Intermediate BASIC**, and **Advanced BASIC** - each consists of 4

cassette tapes with 4 printed texts. In the first four-part module it is assumed that the learner has no previous programming experience. Topics include commonly used BASIC language instructions and commands. Sample programs illustrate the use of each type of instruction. The second four-part module, **Intermediate BASIC**, includes material on TAB and PRINT USING output instructions, structured programming concepts, subscript notation, list processing, and user-defined functions. The third module, **Advanced BASIC**, covers subroutines, matrices, and file processing. Sample program listings and corresponding outputs are included in the printed texts.

All three modules constitute the BASIC language programming course which sells for \$48. Individual modules sell for \$19.95 each.

Williamsville Publishing Company, Box-237, Williamsville, NY 14221.

CIRCLE 273 ON READER SERVICE CARD

### BASIC WORD ATTACK MASTERY SYSTEM

Centurion Industries Incorporated announces the introduction of its latest technological learning support system, the Centurion "Basic Word Attack Mastery System," designed to provide students with mastery learning of the basic structure of words in the English language.

The System utilizes three technologically remarkable minicomputers, "alphator I" "alphator II" and "alphamaster" each designed to provide highly motivational learning opportunities for students in the study of basic Language Arts subject areas, including: affixes, syllables, vowel sounds, consonant blends, compound words, spelling, word recognition.

A total of 32 pre-programmed lessons are included within the alphator minicomputers.

Each computer utilizes self-contained programs that display specific educational questions to the student at random. The student responds by pressing the appropriate response key. Correct answers are rewarded by a smiling Happy Face. When a student incorrectly answers a question, the correct answer is provided and the



## Play a little Sol® Music.

It's not really a piano, of course. But a Sol® small computer system can bring music to your ears as it gives you a strong handle on your business.

Priced from \$2500 to \$10,000, these are full business systems in every sense - working tools to keep you on top of all that paper work.

Play a little Sol music at our store. Compare Sol to other small computers. We'll show you how much more a Sol system can do for you.

Phone us today. You'll be happy you did.

**The computer corner**

White Plains Mall, 200 Hamilton Ave.  
White Plains, N.Y. 10601  
(914)WHY-DATA.

"All small computers are not created equal"

Processor Technology

CIRCLE 119 ON READER SERVICE CARD

## TRS-80 COMPUTING

non-profit newsletter  
\$15 (U.S.)/12 issues payable

and now

## PEOPLE'S SOFTWARE

at Popular Prices  
25¢ per program + \$1 tape  
Tape 1 includes 26 Level I  
business/home/educational  
just \$7.50 + 50¢ P. & H.  
(CA residents add 45¢ tax)

Computer Information Exch., Inc.  
Box 158  
San Luis Rey, CA 92068

CIRCLE 126 ON READER SERVICE CARD

AUTOMATED RESOURCE MANAGEMENT INC.



P.O. Box 4353  
Irvine, California 92716

SOFTWARE FOR THE TRS-80

KFS-80  
INDEXED & SEQUENTIAL ACCESS  
PRICE \$49.95 ON DISKETTE

MAILING LIST DATABASE SYSTEM  
MAIL LIST  
NAME, ZIP CODE, DATE 1, OR DATE 2  
ACCESS WITH 30 ATTRIBUTES  
PRICE \$34.95 ON DISKETTE

(CA RESIDENTS ADD 6% SALES TAX)  
WRITE FOR MORE INFORMATION

CIRCLE 157 ON READER SERVICE CARD

## TRS-80™

APPLE II™  
16K RAM

Upgrade for your  
Keyboard • Interface

**\$68**

Plus \$2.00 Postage  
and Handling

Installation instructions  
& Jumpers included!

M/C • VISA • Phone orders

100% guaranteed! - If a part  
ever fails, we'll replace it!

Mich. res. add 4% s.t.

### WANT MORE CUSTOMERS?

We can give you an additional 50,000 potential buyers for your Software, Hardware, Publication or Peripheral TRS-80™ related product, and the cost is less than 20¢ a day!

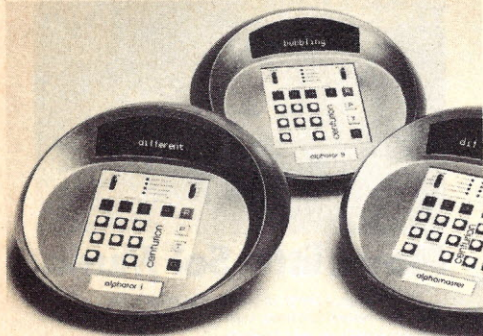
**EDITORIAL ARTICLES** covering use or understanding of TRS-80™ (any level) are now being accepted. Submitted articles should cover software or hardware applications and should be educational and informative. Accepted compositions will be paid 5¢ per word. Interested parties write for FREE brochure.

### ABS SOFTWARE/HARDWARE SUPPLIERS FOR TRS-80™ MICROCOMPUTER

P.O. BOX 8297 • ANN ARBOR, MICHIGAN 48107  
(313) 971-1308

CIRCLE 102 ON READER SERVICE CARD





question is repeated to permit the student to correctly respond.

Programs are presented in series of 10, 20, or 30 questions per program and the machine provides a score at the end of each series. The machine will also automatically review each lesson completed by the student to diagnostically identify the problem areas experienced by the student within that particular series of responses. Each computer also provides for either total self-pacing by the student or controlled response times, selected in advance, that will limit the amount of time given a student to respond. Each computer also includes an electronic clock that measures the accumulated time taken by a student to respond to any given series of questions.

The alphator I and II are priced at \$249.50 each. The alphamaster is priced at \$349.50.

Centurion Industries Inc., 167 Constitution Drive, Menlo Park, CA 94025, (415) 321-0800.

CIRCLE 275 ON READER SERVICE CARD

## PERSONAL COMPUTER INVESTMENT ANALYSIS

Man-Computer Systems, Inc. is a New York based consulting and publishing firm promoting the use of microcomputers for personal computing and small business applications through publications, software development, and microcomputer systems design. Man-Computer Systems, Inc., provides consulting and research services; publishes books; develops custom-tailored microcomputer systems and software; publishes The Computer Consultant Newsletter; offers a 1-day seminar on Personal Computers and Microcomputer-based Business Systems; provides investment advisory services; and, de-

### TRS-80™ T-PAL Programming Amateur's Letter THE "DO-IT-YOURSELF" SOFTWARE NEWSLETTER FOR TRS-80 OWNERS

Published Monthly, We'll Teach You All The Latest Wrinkles — How To Get The Most Out Of Your Computer

Graphics • Games • Personal Business • And Much More!

\$24 per year... or write for FREE DETAILS

THE MAIL MART  
Box 11102C, San Francisco, CA 94101

CIRCLE 161 ON READER SERVICE CARD

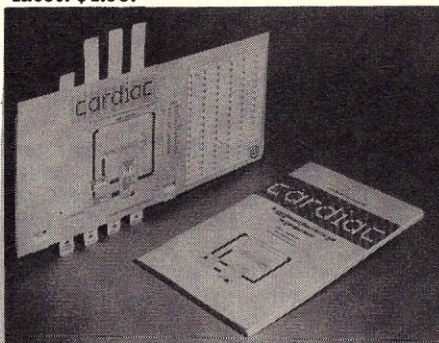
velops low-cost, personal computer based investment decision systems.

Man-Computer Systems, Inc., 84-13 168th Street, Jamaica, NY 11432, (212) 739-4242.

CIRCLE 276 ON READER SERVICE CARD

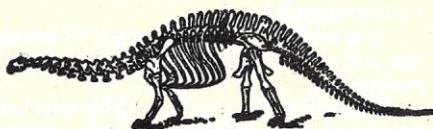
## A COMPUTER LEARNING SYSTEM

CARDIAC is a very powerful and practical manually-operated Computer, which comes complete with a 53-page illustrative manual that explains CARDIAC in terms of real Computers. The student receives his "hands-on" training by operating CARDIAC through a series of ten different programs which range from the simple to the complex. Learning and comprehending this difficult subject is enjoyable, simple and rapid, and the retention factor is excellent because of the "hands-on" facet. \$4.95.



Comspace Corporation, 350 Great Neck Rd., Farmingdale, L.I., NY 11735, (516) 293-5525.

CIRCLE 277 ON READER SERVICE CARD



## WE BUY SELL TRADE

ALL BRANDS & MODELS OF:

- PRINTERS • MINICOMPUTERS
- CRT'S • PERIPHERALS
- MODEMS

AND ALL OTHER DATA PROCESSING EQUIPMENT.

Nearly \$1 Million In Inventory

Phone for Price Quotes

**214/357-5725**



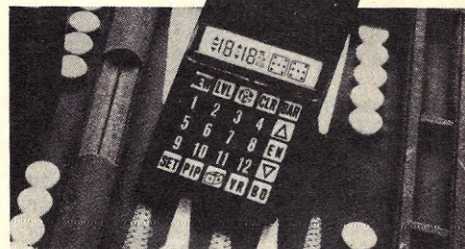
**U.S. BROKERS CO.**

A Division of CM Corp.  
2636 WALNUT HILL LANE  
SUITE 347  
DALLAS, TEXAS 75229

CIRCLE 142 ON READER SERVICE CARD

## GAMES

### OMAR II



A computer based hand-held dedicated game. OMAR II challenges the advanced backgammon player, and is programmed to include all advanced backgammon strategies. Portable, battery operated.

It has two levels of playing style, modern or classical; electronic doubling cube with advanced doubling theory; pip count; tournament cumulative score-keeping; backgame, diversification, and duplication theories; sound; position update; electronic or manual dice entry; position verification; LCD display; and is battery operated.

OMAR II is packaged with portable backgammon set. \$79.95.

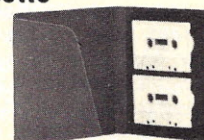
Tryom, Inc., 23500 Mercantile Rd., Beachwood, OH 44122.

CIRCLE 278 ON READER SERVICE CARD

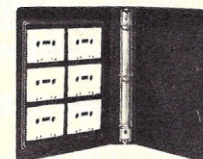
## RELIANCE

America's Most Versatile  
Line of Customized  
Audio Visual Packaging

Audio Cassette  
Albums

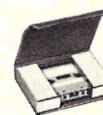


CA2-2N

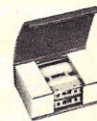


CA2LL-6

Corrugated Mailers



M-1



M-2

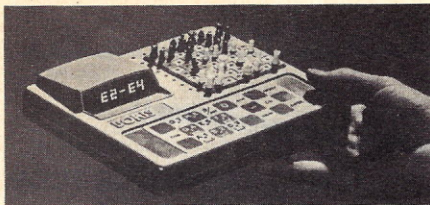
For complete catalog write or phone:

**RELIANCE** Plastics & Packaging Division  
108-18 Queens Boulevard  
Forest Hills, N.Y. 11375 (212) 544-9800

CIRCLE 189 ON READER SERVICE CARD

CREATIVE COMPUTING





## NEW BORIS CHESS GAMES

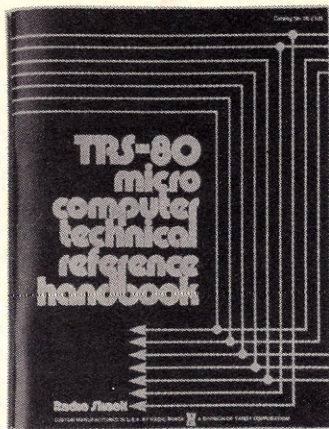
Chafitz, Inc. announces the addition of several new models to their line of BORIS, the talking chess computer. Designed to teach chess by suggesting moves for the beginner and playing at varying skill levels, experienced players can use BORIS' exclusive position programming feature to set up special board positions for practicing strategies or to remove pieces for handicapping. During each game, BORIS flashes messages to his opponent. BORIS knows all classic chess moves and solves any mate-in-two problem.

BORIS MASTER, housed in a solid walnut case, operates for 8 hours on rechargeable batteries. His special Position Storage Memory holds board positions for up to one week, allowing games to be interrupted and resumed during that time. BORIS GRAND MASTER is the world's only fully-electronic dedicated chess computer, requiring no chess board or pieces. His electronic chess board displays each chess piece and each move by electronic symbols. While he is considering his next move, the electronic chess piece symbols display his analysis of the candidate moves. BORIS GRAND MASTER is battery operated and includes the exclusive Position Storage Memory found on the BORIS MASTER model. Another new model, BORIS DIPLOMAT, a compact, briefcase-sized portable, operates on batteries and has a built-in chess board with pieces. Suggested retail prices starting at \$119.95.

Chafitz, 1055 First Street, Rockville, MD 20850, (301) 340-3300.

CIRCLE 279 ON READER SERVICE CARD

## BOOKS AND BOOKLETS



### TRS-80 TECHNICAL MANUAL

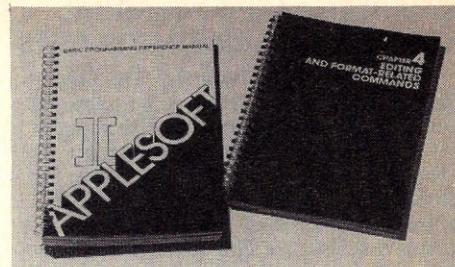
Radio Shack has published a technical reference handbook for their TRS-80 Microcomputer System. The illustrated, 108-page book is intended primarily for technically oriented persons with a good working knowledge of digital logic circuits.

Written in the straightforward, informal manner that has become a hallmark of Radio Shack publications, the TRS-80 Microcomputer Technical Reference Handbook includes technical information and schematic diagrams for both Level-I and Level-II TRS-80 systems.

Topics covered in the book are: Theory of Operation, Adjustments and Troubleshooting, The Outside World (connections to external devices), Parts List and fold-out Schematics.

The TRS-80 Microcomputer Technical Reference Handbook is priced at \$9.95. The 8 1/2 x 11" softbound book is available from participating Radio Shack stores and dealers.

CIRCLE 280 ON READER SERVICE CARD



### APPLESOFT II BASIC PROGRAMMING REFERENCE MANUAL

Apple Computer, Inc., announced the availability of their new programming reference manual, for the Applesoft II language. The manual describes the extended programming capabilities which Applesoft II Floating-Point BASIC offers.

Applesoft II language is an expanded version of BASIC. Its 9-digit arithmetic and large function library make it better suited for business and scientific applications than Integer BASIC. By adding a few new words to BASIC, features like high-resolution color graphic routines, cassette data STORE/RECALL and user-programmable error messages become immediately available with this powerful and easy-to-use language.

Applesoft II BASIC is available in two versions: RAM-based Applesoft and firmware Applesoft.

The Applesoft II reference manual (\$6.95) assumes that the reader has a working knowledge of BASIC; it is not intended as a text on BASIC. Advanced programmers will find the manual especially helpful.

Apple Computer, Inc., 10260 Bandley Dr., Cupertino, CA 95014.

CIRCLE 281 ON READER SERVICE CARD



## NEW TRS-80 LEVEL II 16K NEW

## THE STOCK EXCHANGE

A real-time stock market simulation game .... A stimulating venture into stock trading for one or two investors... Watch the market trend, keep an eye on the changing stock prices and look for news on the news ticker .... Go to your portfolio, place your buy/sell orders .... Make (or lose) a bundle .....

Fascinating ..... Outright habit-forming ..... \$15.95

SEND ORDERS TO:

©1979 MICRO-FANTASTIC PROGRAMMING

P.O. BOX 2307 GRAND CENTRAL STATION NEW YORK, N.Y. 10017



## COMPUTER BASED PERSONAL INVESTMENT DECISION SYSTEMS

This 169 page book by Dr. Jerry Felsen explains how to develop personal computer-based systems for the support of investment decision making. It presents general design principles for developing personal computer (PC) systems capable of becoming the investor's assistant. The book shows how to design man-computer investment decision systems in which the investor and computer work together as partners. The author also explains what is a PC ... how are PC systems organized ... what personal computing hardware and software is available ... how to estimate its costs and benefits ... and much more. The book is written in an easy-to-read language emphasizing the practical aspects of PC applications. \$15.

Man-Computer Systems, Inc., 84-13 168th Street, Jamaica, NY 11432, (212) 739-4242.

CIRCLE 282 ON READER SERVICE CARD

## PROTECTING PRIVACY

**PRIVACY: HOW TO PROTECT WHAT'S LEFT OF IT** by Robert Ellis Smith, publisher of **PRIVACY JOURNAL**, is a consumer guide to protect your right to be let alone. Includes profiles of recordkeeping by banks, insurance companies, mailing list companies, schools, government agencies, doctors and others, followed by specific advice on how to regain control over personal information about yourself. Concludes with descriptions of new technology threatening individual rights, and chapters on sexual privacy and physical privacy. 346 pages with notes and index, \$10 at booksellers paid by direct mail for \$10 plus \$1 postage prepaid from **PRIVACY JOURNAL**, P.O. Box 8844-D, Washington, D.C. 20003.

CIRCLE 283 ON READER SERVICE CARD

## COMPUTER STORES AND THE SALE OF SMALL BUSINESS COMPUTERS

This report provides an up-to-date examination of Computer Stores as an evolving channel for the distribution of small business computer systems and associated products. The report is based on proprietary surveys and personal interviews with many of the 750 computer stores in the U.S. Also interviewed were key forces in the field such as: Texas Instruments, ComputerLand, Byte Shops, Digital Equipment Corporation and IBM. This outlet is forecast to represent \$1 billion in sales by 1982. 115 pages; issued January 1979. \$750.00. (Watch for a review of this report in an upcoming issue of **CREATIVE COMPUTING**). Catalog of reports free.

Strategic Business Services, 4320 Stevens Creek Blvd., Suite 215, San Jose, CA 95129. (408) 243-8121.

CIRCLE 284 ON READER SERVICE CARD

## MAGAZINES, JOURNALS

### SMALL BUSINESS COMPUTER NEWS

This publication comes out monthly and consists of 20 double-spaced type-written pages of information about small business computers, peripherals, and software. While most of the published information is drawn from free manufacturer literature, you'd have to be very alert and knowledgeable to get your hands on all of it.

Once a year, Small Business Computer News takes a survey among users of small business systems and publishes the ratings of small business systems, peripherals, and software in five categories: performance, reliability, ease of use, service and support. Computers included in the latest survey ranged from micros like the TRS-80 and SOL to HP and DEC minis and to big "small" systems like the NCR Century and IBM System 3. Some conclusions:

- Service and support receive lower ratings than performance and reliability.
- Software ratings as a group are much lower than hardware ratings.
- The top four preferred companies are IBM, DEC, DG and HP.
- Six computer systems received a 3.0 or better rating on all five categories; four of these six were made by IBM.
- Of 23 software vendors, only one, Systems Management, Inc., received a 3.0 rating or higher in all categories.

All the detailed ratings and conclusions are in the Feb. 1979 issue of Small Business Computer News. Annual subscription is \$70. Back issues are available to subscribers only for \$5.50 each.

Management Information Corp., 140 Barclay Center, Cherry Hill, NJ 08034. (609) 428-1020.

CIRCLE 285 ON READER SERVICE CARD

### NEWSLETTER

Cross Associates, announced the availability of **CROSSWORDS**, a periodic newsletter highlighting tools and techniques in selling software, data services, and turnkey systems. Any company engaged in the development, sale and support of computer based products and services should look to **CROSSWORDS** for helpful hints, insights to trends, results of experiments, and in general, the successes and failures associated with marketing in a highly competitive marketplace.

Subscription to **CROSSWORDS** is free of charge and can be obtained by sending your name and address to Editor, **CROSSWORDS**, %B. Cross Associates, Suite 530, 9000 Keystone Crossing, Indianapolis, IN 46240, (317) 844-2010.

CIRCLE 286 ON READER SERVICE CARD

## TOOLS

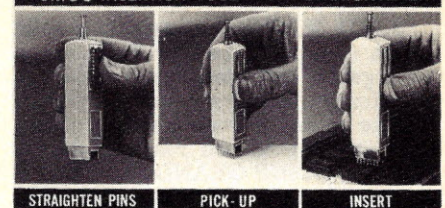
### DIP/IC EXTRACTOR TOOL

The economical new EX-1 Extractor from OK Machine and Tool Corporation is ideally suited for hobbyist or lab engineer. Featuring one piece spring steel construction, the tool will give years of dependable use. It will extract all LSI, MSI and SSI devices of from 8 to 24 pins.

O.K. Machine and Tool Corporation, 3455 Conner Street, Bronx, NY 10475, (212) 994-6600.

CIRCLE 287 ON READER SERVICE CARD

### CMOS INSERTION TOOL WITH PIN STRAIGHTENER



### MOS & CMOS SAFE INSERTION TOOL WITH PIN STRAIGHTENER

New Model MOS-1416 DIP Insertion Tool inserts both 14 and 16 pin IC packages into sockets or predrilled boards. Total conductivity reduces static electricity. Ground strap may be easily attached for highly sensitive MOS & CMOS IC's. Durable chrome plated ABS construction features precision parts. Narrow profile permits tool to work on densely spaced patterns, while unique insertion mechanism assures accuracy as well as excellent "feel." The tool includes a remarkable pin straightener built into the handle. Simply insert the IC, rock it on the straightening saddle, and push down on the tool. An automatic ejector delivers the IC ready to be placed in the insertion end for installation in your board or socket.

O.K. Machine and Tool Corporation, 3455 Conner Street, Bronx, NY 10475.

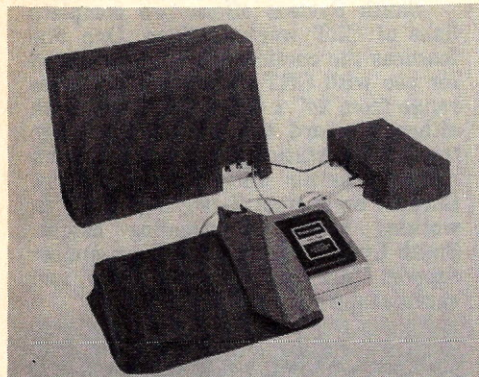
CIRCLE 288 ON READER SERVICE CARD

## Creative Computing





## MISCELLANEOUS



### FABRIC DUST COVERS FOR THE TRS-80.

These covers are individually made from velour, corduroy, or denim in a variety of colors. The fabric keeps dust from sensitive components, yet allows heat buildup to escape, as opposed to plastic covers. Static is not a problem for these covers. All are machine-washable and pre-shrunk. The velour models shed wrinkles. The current options are red, maroon, green, or gold velour; blue or brown corduroy, and blue denim. \$19.95 for each 3-piece set (plus \$1.00 shipping).

August Automation, 42 West St., Westboro, MA 01581, (617) 366-2431.

CIRCLE 289 ON READER SERVICE CARD



### CASSETTE TAPE ERASER

Removes recordings in one second. This high-quality cassette eraser will erase recorded cassette tapes to a level below the original recording, and will maintain original tone quality with minimal tape hiss.

It requires no external power source or internal batteries. There are no moving parts and it can operate practically forever with built in magnets which generate the erasing field and never lose their intensity. Full instructions included. \$17.75.

Trans Globe Trade Enterprises, P.O. Box 24797 Dep. CRC, Los Angeles, CA 90024, (213) 820-5290.

CIRCLE 290 ON READER SERVICE CARD

### SUNI STENO TYPE SYSTEM

A new stenotype notation system has been devised which would make it possible for a stenotypist to produce finished hardcopy on location. Next time you record on a tape recorder, know that if your company had a Suni stenotypist and an inexpensive minicomputer tran-

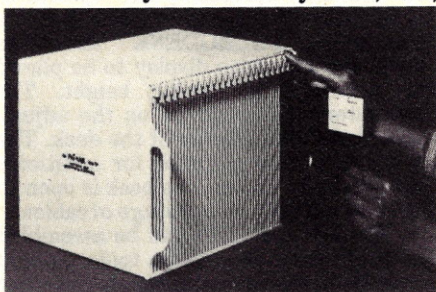
scriber, you could have hardcopy the moment you clicked off your tape recorder upon completing your dictation. The Suni stenotypist and transcriber is also ideal for providing quick and accurate hardcopy for business meetings, conventions, court procedure, etc.

Suni V. Perez, Box 7303, Ocala, Florida 32670, (904) 687-3015; or Marc Todd, COMPUTING SERVICES, INC., (904) 372-5540.

CIRCLE 291 ON READER SERVICE CARD

### DISKETTE STORAGE AND INSTANT RETRIEVAL SYSTEM

A new diskette storage and retrieval system that features instant diskette retrieval at the push of a button has been announced by Printcraft Systems, Inc.,



The system helps keep diskettes neat, clean, and away from office hazards. The high impact plastic housing is portable and stackable. It is available in 3 convenient storage capacities: 15 slot system for \$69.95, a 30 slot unit for \$119.95, and a 50 slot system for \$179.95.

Printcraft Systems, Inc., Data Supplies Division, 11-17 Beach Street, New York, NY 10013, (212) 966-0001.

CIRCLE 292 ON READER SERVICE CARD

### MINI/MICRO DISKETTE STORAGE POCKETS

Clear vinyl pockets with pressure sensitive backing, are available from Printcraft Systems, Inc.

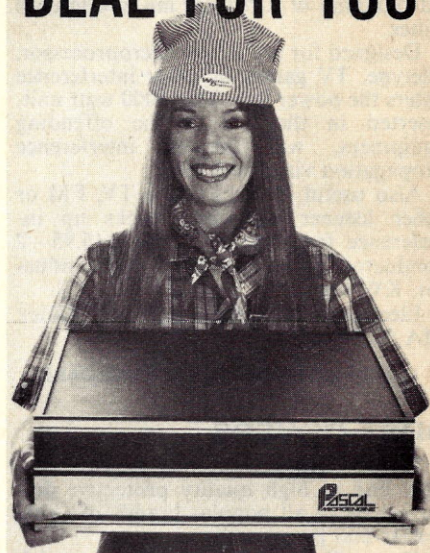


The pockets adhere to any flat, dry surface. Pockets convert standard and hanging type file folders into a convenient and inexpensive storage and retrieval system. In addition, original and/or hard copy printout can be stored together. Sold in packages of 50. \$17.50

Printcraft Systems, Inc., Data Supplies Division, 11-17 Beach Street, New York, NY 10013, (212) 966-0001.

CIRCLE 293 ON READER SERVICE CARD

## HAVE I GOT A DEAL FOR YOU



### Western Digital's Pascal MICROENGINE™ Computer \$2995.00

- Enclosure
- Power Supply
- UCSD Pascal (Release 3.0)

### Dual 8 inch Floppy Disk Drive System \$2495.00

- Single Sided
- Double Density (Total 1-Megabyte)
- Power Supply
- Enclosure

### CABLES \$100.00

- Disk Drive Cable
- CRT Cable

### Dr. Kenneth L. Bowles "Beginners Manual for UCSD Pascal Software System" \$9.95

### One Year Free Membership in the PASCAL USERS GROUP \$6.00

**TOTAL LIST \$5605.95**

### ★ OUR GIVE-AWAY PRICE ★

# \$3995.00

**ACT FAST: Offer Limited to 200 Units**



- California Residents add 6% Sales Tax.
- Factory Guaranteed.
- Mastercharge and Visa card accepted.
- F.O.B. Costa Mesa, California.
- C.O.D. requires 10% deposit with order.
- Delivery from stock to six weeks.



**LEE MATHEWS & ASSOCIATES**  
3095 Red Hill Avenue  
Costa Mesa, California 92626  
(714) 557-0560

CIRCLE 156 ON READER SERVICE CARD



## POWER LINE FILTER

Electronic Specialists announces the introduction of a Power Line Interference Filter.

Designed for use where microprocessor, teletype, TV games or other interference enters the power line. This 1000 watt unit, inserted in the line at the offending equipment, will prevent interference propagation via power lines.

Also useful in cases where TV, FM or other listener equipment picks up interference from the AC lines. \$15.95—2 conductor, KW Load. \$19.25—3 conductor, KW Load.

Electronic Specialists, Box 122, Natick MA 01760.

CIRCLE 294 ON READER SERVICE CARD

## DUST COVERS

Cover Craft has recently announced a new line of high quality protective dust covers to fit all popular brands of Computers and peripherals.

Dust Covers for popular models manufactured within the last two years will shortly be available at retailers across the country.

Cover Craft, P.O. Box 555, Amherst NH 03031.

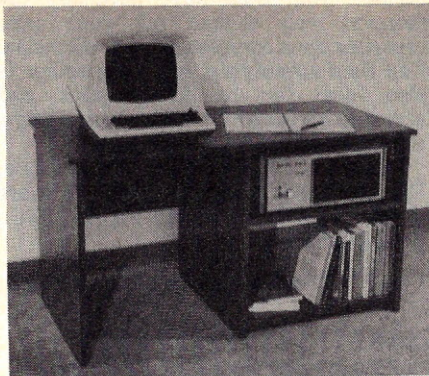
CIRCLE 295 ON READER SERVICE CARD

## DUST COVERS

Digital Dynamics Incorporated announces the COMPUTER CANOPY line of dust covers for microcomputers and peripherals. Initial offerings in this line of quality dust covers include models especially designed for the APPLE II and PET microcomputers and the H-9 terminal. COMPUTER CANOPY dust covers are made of heavy duty upholstery grade, multiple-ply vinyl with cloth backing. These dust covers provide attractive, yet functional protection in the home, office or school. All top seams are reinforced with attractive cording for rigidity and strength. Initially the COMPUTER CANOPY is being offered in two decorator colors, deep textured walnut and textured tan. Apple, \$14.95. Pet & H-9, \$20.95. DIGITAL DYNAMICS INCORPORATED, P.O. Box 27243, San Antonio TX 78227.

CIRCLE 296 ON READER SERVICE CARD

For over 100 computer and robot cartoons, get the Colossal Computer Cartoon Book, only \$5.70 postpaid from Creative Computing, P.O. Box 789-M, Morristown, N.J. 07960.



## DESK FOR MICROCOMPUTER SYSTEMS

A desk designed to house a business or personal microcomputer system is now available from Computer Systems Design. The "MICRODESK" allows the keyboard and video display to be placed at a convenient typing height. The computer may be placed on the adjustable shelf or on the top of the desk. The fixed shelf may be used for additional equipment or books. The back is open to allow ventilation and passage of cables.

The MICRODESK can be assembled in a few minutes without tools. Special clips hold the pieces securely together and two cross braces provide rigidity. Construction is high density particle board covered with a hard plastic walnut-grained laminate. The desk measures 48"L x 24"W x 26"H and the shelves are 23" x 23".

Computer Systems Design, 906 N. Main, Wichita, KA 67214.

CIRCLE 297 ON READER SERVICE CARD

## COMPUTER DESK

Cromemco offers a beautiful, new computer desk for the System Three and other Cromemco computers. The desk is styled and constructed to fit into any office surroundings or professional environment.

The computer is mounted into a special shelf under the desk. This leaves the top completely free for a terminal, printer, or other unit or as a work surface while still providing the operator easy access to the computer for disk loading and unloading.

The desk top is an attractive beige color designed to harmonize with the medium-light wood veneer ends. The top surface is a tough, laminated plastic. \$695.

Cromemco, Inc., 280 Bernardo Avenue, Mountain View CA 94043.

CIRCLE 298 ON READER SERVICE CARD

## DATA WORK STATION FURNITURE

Smith System offers two complete lines of CRT work stations. One line features the comfort edge top designed for use with CRT terminals. Top sizes range from 24" x 30" to 30" x 60" with either standard tops or comfort edge tops. Work stations are available with modesty panels and storage shelves. Chrome or enamel T-Bar legs come in working height or standing height. Smith System also has other computer support furniture including files and various tape storage systems.



Smith System Manufacturing Co., P.O. Box 43515, St. Paul, MN 55164, (612) 636-3560.

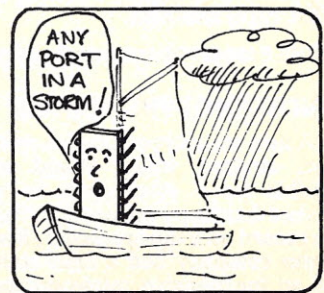
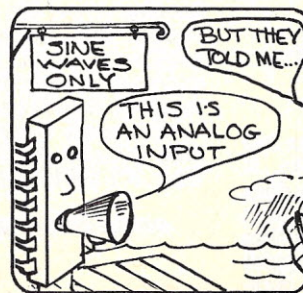
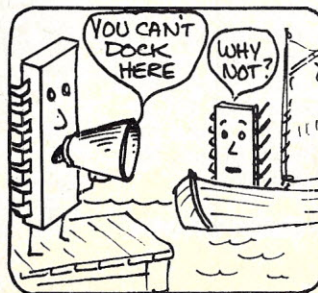
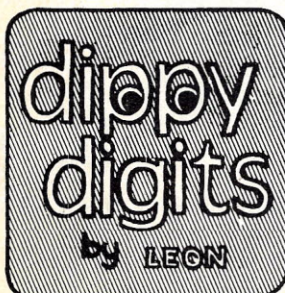
CIRCLE 299 ON READER SERVICE CARD

## COMPUTERIZED WEATHER STATION

Heath Company, the world's largest manufacturer of electronic kits, announces the availability of its new ID-4001 Computerized Weather Station. The microprocessor-based ID-4001 indicates time, indoor and outdoor temperatures, wind speed and direction, and barometric pressure on an upright display panel utilizing large LED readouts. It will also display average wind speed and automatically calculate wind chill factor as well. The ID-4001's memory allows instant recall of date and time of maximum and minimum temperatures, date and time of wind gusts, and the date and time of maximum and minimum barometric pressure. It can even indicate the barometric pressure's rate of change per hour and tell if it is rising or falling. \$369.

Heath Company, Dept. 350-730, Benton Harbor MI 49022.

CIRCLE 300 ON READER SERVICE CARD



© L. WILDE 1977



# Did you miss any issues of creative computing?



The following back issues of Creative Computing are still available. But they won't be for long, so order today if you want to fill in the holes in your collection. Our programming articles are timeless so you're not buying obsolete information.

Prices on 1976 and 1977 issues are \$2.00 each postpaid or three for \$5.00. 1978 and 1979 issues are \$2.50 each postpaid, three for \$7.00 or six for \$12.00 postpaid.

## Vol. 2, No. 5—Sep/Oct 1976

Computer programming contests, Russian computing, Do-it-yourself computer poetry (3 articles), two games: Watchman and Delmar, four feature reviews of "Computer Power and Human Reason," Computers in elections, two great stories.

## Vol. 3, No. 1 - Jan/Feb 1977

Equipment profiles: Teletype model 43, IMSAI 8080, SWTPC 6800, Computers in the movies, All about Electronic Funds Transfer, Centerfold "Computer Tree": Babbage to 370/158, A approach for analyzing discontinuous events, unsolvable complex problems, the Woolly Mammoth problem, ten outstanding problems for computer solution, Games: Drag, Masterbagels, Strike 9.

## Vol. 3, No. 4 - Jul/Aug 1977

Guide to selecting a microcomputer. Write your own CAI, Part 2. Computers in medicine and health care. Dwyer: "8-Hour Course in Basic- Part 1," "Thinking Strategies- Part 3." Sherlock Holmes and Charles Babbage. Four new games.

## Vol. 3, No. 5 - Sep/Oct 1977

A dynamic debugging system for 8080 assembly language, bibliography of "limits to growth" models, Dwyer: 8-hour

course in Basic-Part 2, Programming approaches to solving complex equations, Electronic information exchange, Symmetric art with your computer, in-depth reviews of 5 microcomputer BASICs, software technology music system, Games: Nomad, Rotate, Lissajous.

## Vol. 3, No. 6 - Nov/Dec 1977

Programming techniques- Part 1. CAI. Topics in Logic. Three 8080 8K BASIC evaluations. Smart electronic game reviews. How computers can write final exams. Mastermind II and Otherllo computer games. Profile of the Alpha 1 and Alpha 2 for the TDL Xitan.

## Vol. 4, No. 1 — Jan/Feb 1978

File structures, 16-bit computers, LOGO language, Murphy's laws, review of Radio Shack TRS-80 and Heath H8, World model, biorythms, how to write a simulation, Hart sort algorithm, 3 games, 8-Hour Basic Course - Part 4.

## Vol. 4, No. 4 - Jul/Aug 1978

Reviews of Commodore PET, Apple II, Atari computer, Video games, interfacing to the real world: 5 articles, business computing: 4 word processing systems, ROM section: 7 articles, backgammon game, bar code.

## Vol. 4, No. 5—Sep/Oct 1978

Equipment profiles: TRS-80, Exidy Sorcerer, Bally Arcade, PolyMorphic 8813, Merlin Video Display preview of nine new personal computers. Accounts receivable systems, All about PASCAL, real world games, a real time clock to build, PET cassettes, special education features, new software: Star Wars, Hex,

## Vol. 4, No. 6—Nov/Dec 1978

Subject index and file index in BASIC, consumer computers buying guide, electronic game reviews, critical path analysis, mailing label programs, robot programming, experiment in teaching strategic thinking, evaluations of Northstar Horizon, CP/M operating system and backgammon computers, columns on Apple II PET and TRS-80, plus game section including "Corral", "Joust" and "Puzzle".

## Vol. 5, No. 1 - January 1979

Computers in fiction; Survey of Educator's Attitudes; K-State; How to Hide Your Basic Program; World Chess Championship Computer; Compleat Computer Catalog, Microchess for the TRS-80; Exidy Sorcerer; Ohio Scientific Superboard II; Robots in Fiction; Help for the Weary Taxpayer; A Counterfeit Cursor for your PET; Medical Audit Time.

## Vol. 5, No. 2 - February 1979

Evaluations: Electric Pencil, Heathkit H-8, Computer Music Records. Computer Games: Gold Mine, Atom-20. Computerized Sports Predictions, Multiple Regression Analysis Simplified, Value of Computers in Education, Budget Management System, Help for the beleaguered consumer.

For faster service, use your Visa or Master Charge and call our toll-free order line:

**800-631-8112**

(In NJ, call 201-540-0445)

Please send me:

\$2/each, 3 for \$5, 6 for \$9

- ☐ Sep/Oct 1976
- ☐ Jan/Feb 1977
- ☒ Mar/Apr 1977
- ☒ May/June 1977
- ☐ Jul/Aug 1977
- ☐ Sep/Oct 1977
- ☐ Nov/Dec 1977

\$2.50/each, 6 for \$12

- ☐ Jan/Feb 1978
- ☒ Mar/Apr 1978
- ☒ May/June 1978
- ☐ Jul/Aug 1978
- ☐ Sep/Oct 1978
- ☐ Nov/Dec 1978
- ☐ Volume 1 bound, \$10
- ☐ Volume 2 bound, \$10

Total amount \_\_\_\_\_

☐ Cash, check,  
or M.O. enclosed



☐ VISA



☐ MASTER  
CHARGE

Card No. \_\_\_\_\_

Expiration date \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

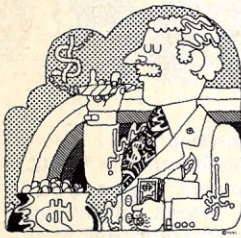
Zip \_\_\_\_\_

Return form to: CREATIVE COMPUTING,

P.O. Box 789-M, Morristown, New Jersey 07960



# ium...compendium...co



## ENTER : TI

Many personal computer manufacturers have recently been experiencing a financial crunch. The entrance of Texas Instruments into the market within the near future probably will not enhance the prospects for many of the companies.

Early in March it was reported that Imsai, one of the original suppliers to the personal market in the form of computers and kits for hobbyists, had been put up for sale. The smaller companies which were undercapitalized have been forced either to change their direction or to file under Chapter XI. Both The Digital Group and Interactive Products Corp. (Polymorphic Systems) have filed under Chapter XI. Realistic Controls was recently sold and is now Nylac Computer Corp.; the Vista Disk subsidiary of Randal Computer Systems is up for sale; and American Used Computer has withdrawn from the computer hobby market. TDL and Mini Term have gone out of business altogether.

It is difficult for the smaller companies to compete with such large concerns as Radio Shack, Apple, Atari and Commodore. All of these companies, because of their better financial positions, are able to sell computers at lower prices than the smaller firms. Those companies that originally had the hobbyist market cornered were forced to overextend themselves into the small business computer area, and, as a consequence, were forced to use more of their capital to be competitive.

The entrance of Texas Instruments, as well as Japanese firms, into the market will undoubtedly force other companies out of business. The sales of personal computers will then rest with the large corporations that can afford the lower prices.

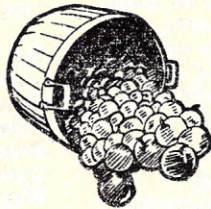
## BYTE THE APPLE

Byte Industries, Inc. recently filed a \$1.1 million lawsuit against Apple Computer in the San Francisco US District Court.

According to a May 19, 1978, 1-year agreement, Byte was to be

an independent distributor of Apple products in the US, Canada, and Mexico.

In court papers filed in San Francisco, Byte said Apple and "certain unknown co-conspirators" have conspired to terminate the agreement, to repudiate purchase orders and refuse to make deliveries, to boycott Byte by refusing to do business, to interfere with Byte's business relations by inducing dealers to refuse to purchase Apple products from Byte, to induce dealers to breach their contracts with Byte, and to induce the breach of Apple's distributorship agreement.



Byte charged that "Apple terminated Byte's distributorship solely because Apple and certain other as yet unknown co-conspirators wish to eliminate Byte as a competitor in the sale and distribution of Apple products and other microcomputers and related accessories."

Byte distributes its product line to 70 authorized independent Byte dealerships and other outlets.

—Electronic News, March 19, 1979

## FCC TESTS

Radio Shack, Atari, Apple, Commodore, Heath and Southwest Technical are the six personal computer manufacturers that the Federal Communications Commission has asked to submit their equipment for review. The purpose of the review is to test the level of interference with television broadcasting in order that a minimal level of radiation can be established.

Although the equipment produced by the firms does not fall under the jurisdiction of Class I TV devices, the FCC is able to review the equipment under a rule that covers any equipment emitting a radio frequency. It is possible that the FCC will develop two standards: one which applies to those computers used in a business environment and one which applies to computers used in the home.

The FCC's interest in the home computer area was precipitated not only by the fact that most of the manufacturers had apparently been bypassing the FCC, but also Texas Instruments' proposal that a

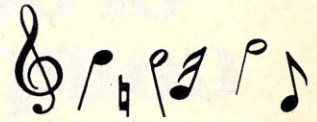
Class II TV device classification be created. The TI proposal would effectively weaken the FCC's control over computers and peripherals used in conjunction with TV's.

The companies involved with the FCC investigation are complying willingly. Certain problems may arise, however. Should there be two sets of standards, one for business and one for home computers? What will be the allowable emission rate? Will those computers already sold have to be replaced? What kinds of fines will be imposed against those companies that refuse to comply?

## ACOUSTIC MICROSCOPE

Chen Tsai, professor of electrical engineering, has developed a new type of microscope which employs sound waves rather than light to illuminate and examine small objects.

In research sponsored by the National Science Foundation and conducted at CMU's Center for Joining of Materials, Tsai and his students have built a scanning acoustic microscope (SAM) which employs very high frequency



sound waves. The first SAM was developed by C. Quate and his student R. Lemons at Stanford University a few years ago. Unlike conventional optical microscopes, the SAM can illuminate and examine details deep below the surface of an opaque sample.

In experimental work, Tsai and his students have used the SAM to examine various specially made joints as well as microelectric components to detect voids and other defects hidden below the surface. A poor bond between materials, faulty soldering or other manufacturing flaws become immediately obvious when the microscope's image is enlarged many times and displayed on a CRT screen, similar to a TV set. Tsai has already been approached to conduct testing for a number of electronics manufacturers, since the SAM can perform non-destructive diagnosis of microelectronic components. Like other researchers in the field, Tsai believes that this new instrument holds great promise in a whole variety of materials testing, and quality control applications.

Carnegie Mellon Alumni News, March, 1979

## New T-SHIRT



Amaze your friends (and enemies too) when you dress your bod in our exclusive Computer Bum T-shirt. Design is in black on a gray shirt with black sleeve and collar trim. Color-coordinated with any sweat pants and most computer keyboards. Wow! Adult sizes, S,M,L,XL. \$5.00 postpaid in USA, \$6.00 foreign. No COD's. Creative Computing, P.O. Box 789-M, Morristown, NJ 07960. Double Wow!!



## STUDENTS CLAIM COMPUTER MARATHON RECORD

After a demanding 8½-day marathon, the students of San Antonio's Holy Cross High School are to be recognized. They were part of a computer marathon!

The famous Guinness Book of World Records, which lists such exotic feats as marathon flagpole sitting, breath holding and rope jumping, as of yet has no category for computer marathons. But the 311 Holy Cross students who took part in the around-the-clock computer training session during January believe that their accomplishment deserves a mention in future record books.

Instructor Dennis Doose suggested the computer training marathon after students began staying voluntarily after class to use the school's TRS-80 Microcomputer System.

"So what better way to get as many students as possible exposed to computers?" Doose asked. He then explained that Radio Shack, manufacturer of the TRS-80, agreed to loan the school 22 additional microcomputers for the event.

The response was "fantastic," according to Doose, who added that students were actually lined up at the door when the computer training marathon began on Friday, January 12.

About 206 hours later, 311 Holy Cross students had logged time on the computers. Although most had never used a computer before, everything went smoothly.

The students took turns, and at least two computers were in constant use throughout the marathon, which ended at 9 A.M. on Sunday, January 21.

More experienced students even brought sleeping bags so 24-hour supervision would be available for computer novices.

As a result of the marathon, 72 students completed the TRS-80 computer programming course.

Actual teaching duties were handled by the computers. As students learned a particular microcomputer function, the TRS-80 automatically advanced to the next lesson.

Students "talked" to the computers in BASIC through the TRS-80 keyboard units. The computers "taught" with words and pictures displayed on the computer video monitors.



### "SORRY, SIR"

A CALLER to New York Telephone's directory assistance last week was told the requested number couldn't be provided because the computers were out of order. Asked if she could look up the number in the phone book, the operator replied, "This is the modern age, sir. We haven't any phone books—only computers. But the computers are broken."

— The Wall St. Journal

## ADAM SMITH REPLACED BY COMPUTERS

"We are transforming the craft of business management into an applied science," says Sidney Schoeffler, executive secretary of the Strategic Planning Institute. The Institute's computers receive the operating results of 1500 business enterprises, analyse the data, and form general business laws. Some of the Institute's new rules upset assumptions still held by business schools and practiced in business.

For example, the computers, based at Harvard Business School, discovered that heavy capital investments in modern technology are relatively unprofitable for most companies. Although the public sector benefits through higher wages, lower prices, and better

quality merchandise, the companies do not profit. Instead, investments in technology lead to intense competition for volume and price wars.

Other findings are equally surprising. Trust-busters should know that the more concentrated a business is, the more it performs in the public interest. Marketing departments will receive a greater investment return if the introduction of new products is limited to times when the company's market is not growing.

These new principles will undoubtedly be questioned by many businesses. Yet Schoeffler says that the phenomena are "common, quite clear, and extremely powerful."

**AT LAST!!** Intelligent, innovative, intriguing, interesting, incredibly inexpensive software for your TRS-80 4K Level 1 computer!

**Graftape 1.1** (includes 4 Graphics Programs)  
Super Graphics, Character Graphics, Mazemaker  
on cassette . . . only \$6.79

**Funtape 1.1** (includes 6 Game Programs) Gold Rush, Tic-Tac-Toe, 4D Chase, Math-Whiz, Decapawn, Hexagram  
on cassette . . . only \$5.89

Send cheque or money order, or for more details on these and other exciting programs, write:

**BRUNSWICK COMPUTER SOFTWARE**  
8 Teesdale St. • Moncton, N. B. • Canada E1A 5K5

CIRCLE 113 ON READER SERVICE CARD

## ADIRONDACK FOOTHILLS

We are a young and rapidly expanding company specializing in advanced technology information systems, system hardware and software design, and consulting services. We are seeking trained professionals with a desire to perform original work in one or more of the following areas:

- Advanced technology DOD intelligence systems
- Digital communications and networking
- Parallel and array processing
- Advanced Hardware/Software Systems Architecture
- Microcomputer-based business systems - hardware and software

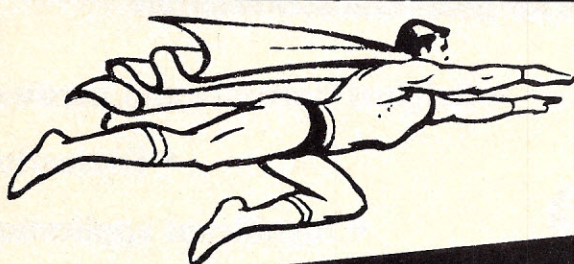
Applicable degrees are desirable, although significant experience will be considered.

We offer an excellent opportunity for career advancement in a stimulating work environment, competitive salaries, and an attractive fringe benefit package including company paid insurance plan. Rome, located at the foothills of the Adirondack mountains, offers excellent year round outdoor sports, recreation, hunting and fishing. Opportunities for advanced education abound in the numerous local colleges and universities.

Call, visit us, or send your resume  
All inquiries handled with the strictest of confidentiality

**MEASUREMENT CONCEPT CORPORATION**  
1333 E. Dominick St.  
Rome, N.Y. 13440 (315) 337-1000

**WE WANT TO FIT YOUR FUTURE!**



**FASTER THAN A SPEEDING BULLET**  
**IT'S THE NEW PASCAL MICROENGINE™ FROM P.P.S.**

- PASCAL MICROENGINE™ ENCLOSED IN A STYLIZED, LOW PROFILE HOUSING COMPLETE WITH POWER SUPPLY
- 64K BYTES (32K WORDS) OF RAM MEMORY
- TWO RS-232C ASYNCHRONOUS PORTS (110-19.2K BAUD)
- TWO 8-BIT PARALLEL PORTS
- FLOPPY DISK CONTROLLER WITH DIRECT MEMORY ACCESS (DMA) IS SWITCH SELECTABLE FOR:
  - SINGLE OR DOUBLE DENSITY
  - MINI FLOPPY OR 8" FLOPPY
  - 1 TO 4 DRIVES (SAME TYPE)
- FLOATING POINT HARDWARE
- SELF TEST MICRODIAGNOSTICS
- ASCII CONSOLE

WE CARRY A FULL LINE OF PRINTERS & TERMINALS AT VERY ATTRACTIVE PRICES, AS WELL AS COMPLETE SUB-SYSTEMS.

### FUTURE EXPANSION

64K BYTES ADD ON MOS MEMORY \$1595.00  
5-20 MEG DRIVES W/CONTROLLER \$7-9K

Send to P.P.S.  
P.O. Box 2051, Seal Beach, California 90740

For fast service or information call (714) 894-3736  
We Accept Mastercharge and B of A  
Dealer Inquiries Invited



## Compendium...

### COMPUTER SPEAKS CHINESE

Two Cambridge University linguists have made it possible for a Chinese-speaking computer operator to communicate directly with a computer in Chinese. Robert Sloss and Peter Nancarrow devised the system as a do-it-yourself project in order to speed their work on a new Chinese-English dictionary.

"I don't think we could have done it if we'd had a lot of money," said Mr. Nancarrow. "Without money, you have to think harder. You have to solve the problem with your brain instead of buying a lot of equipment." The two men built their first working model in three days on Mr. Sloss's kitchen table, using a child's Meccano set (similar to an Erector set), bits of plastic, some string, and a cardboard tube.

Telegraphic communications and data storage in Chinese have previously been accomplished by translating each of the 4,500 characters into numbers. "The error rate was absolutely prodigious," said Mr. Nancarrow.

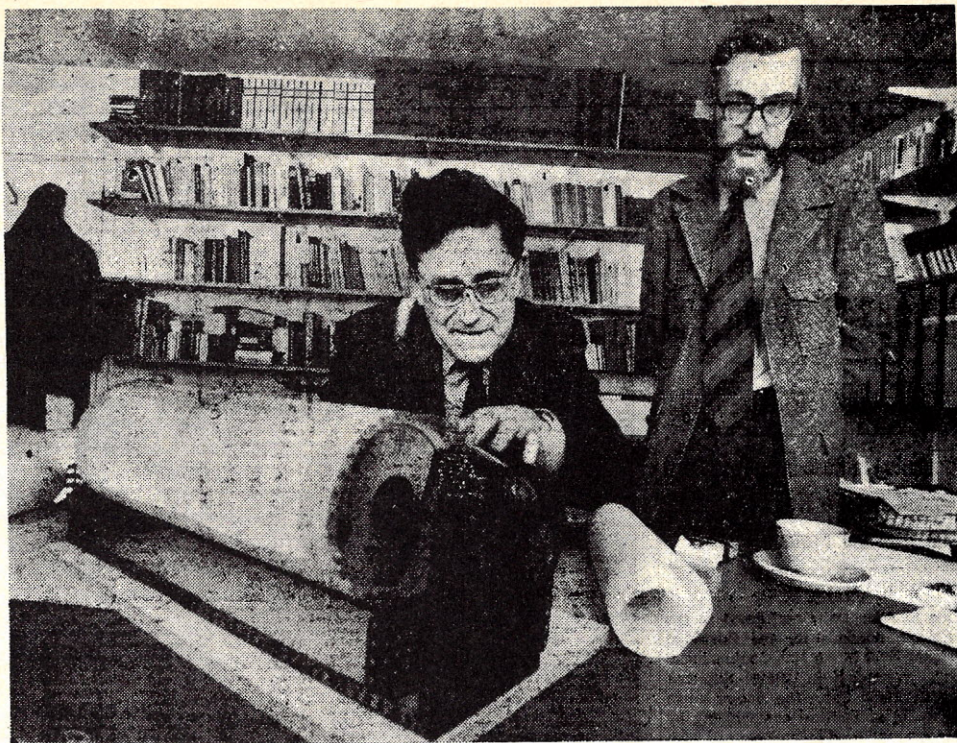
The number of characters was a problem for the two linguists until they discovered the joys of the square root. A grid of 66 centimeters, or 26 inches, square would

give them 4,356 boxes, each one centimeter, or one-third of an inch, square. Then they wrapped the grid around a drum. The position of any character on the grid could be stated in two numbers: 22 across, 43 down.

Teaching a computer to "write"

Chinese was easy. Mr. Sloss and Mr. Nancarrow fed the coordinates for each character into the computer memory with instructions for drawing the ideographs. Cambridge technicians then built a prototype production model for about \$2000.

Cable and Wireless, a British communications organization, has bought the rights to the invention. A Chinese trade delegation has visited Cambridge to see the machine work. "They reacted as if they had seen an electronic dog talking," Mr. Sloss said.



Europe's first magazine for personal computers for home and business use

# PERSONAL COMPUTER WORLD

- Original Software and hardware
- Evaluations
- Significant applications
- Beginners' tutorials
- Matters of public concern
- Cartoons

## THE EUROPEAN PERSPECTIVE

Personal computing in Europe is taking off!

For the latest news, views and comments, read *Personal Computer World* — Europe's first magazine for personal computers for home and business use.

*PCW* brings you a flavorsome mix of software, hardware, evaluations, applications, tutorials, articles, cartoons, and much more. *PCW* is a magazine of distinctive style and quality.

## SPECIAL OFFER

Special offer to the readers of *Creative Computing*:

Twelve issues of *PCW* for just \$15 (usual rate \$20) on subscriptions received within three months of the date of this ad. Sent direct from London.

Please make check or money order payable to:

Intra Press  
62 A Westbourne Grove  
London, W2, England





## Back Issues of **ROM** From the folks at Creative Computing

Some computing magazines are practically timeless. Take ROM for example. The nine back issues are filled with ideas, applications, techniques, games and just plain good reading by authors such as Lee Felsenstein, Theodor Nelson, Joseph Weizenbaum, Bill Etra and Frederick Chesson.

**Get Your Back Copies While They Last!**

### July 1977

SOL. The Inside Story; Braille and the Computer; Video newspaper; A Chip is Born; The Care and Feeding of Your Home Computer; Digital Foam—the peripheral of the future.

### August 1977

The Kit and I, Part I, by someone who's never soldered before; Introduction to the fundamentals of Computer Memory; Tips for the do-it-yourself hardware beginner; Binary clocks; APLomania.

### September 1977

Xeroxes and other hard copy off your CRT; Payroll Program; How Computers Work; The Kit and I, Part II: or Power to the Computer; CCD's: How They Work and How They're Made; A look at PLATO, an Educational Computer System; IBM 5100.

### October 1977

Binary Arithmetic For the Beginner; Microprocessor Aid for the Deaf and Blind; The Kilobyte Card; Scott Joplin on Your Sci-Fi Hi-Fi; Building a Basic Music Board; Flowcharting; Payroll Program

### November 1977

Solar Energy Measurement; A Beginners Introduction to BASIC; The Kit and I, Part III; More Music to Play on Your Computer; Micro Maintenance; Solomon and Viet: Putting Together a Personal Computing System; Time Sharing on the Family MICRO.

### December 1977

A Beginners Guide to Peripherals; The Best Slot Machine Game ever; Artificial Intelligence?; An Electronic Jungle Gym for Kids; File Copy Program; Better Health Through Electronics; the Kit and I Part IV.

### January 1978

Synthetic Skin for Your Robot and How to Make It; TLC: A Visual Programming Language; The Code That Can't Be Cracked; Beginners Guide to Computer Graphics; The Computer and Natural Language; First-Timer's Guide to Circuit Board Etching.

### February 1978

A Practical Mailing List Program; Artificial Intelligence; Assemblers; Flowgrams—A New Programming Tool; Refresher Course in BASIC; Micros and Analyzing Election Results; Upgrading Your BASIC.

### March-April 1978

Introduction to real time concepts; Felsenstein: An Absolute-Time Clock; Dreyfus: Things Computers Still Can't Do; Introduction to Interpreters; Othello Games; Weizenbaum: Incomprehensible Programs; The Quasar Robot Revealed; Chesson: Cryptanalysis.

**The  
computer  
magazine  
for the curious**

**100 Pages Per Issue!**

**Regular Columns by:**

- Lee Felsenstein
- Theodor Nelson
- Joseph Weizenbaum
- Bill Etra
- Frederick Chesson
- Eben Ostby
- A. I. Karshmer
- Andrew Singer

**Get your back copies  
while they last!!**

(We are not planning a *Best of ROM* book.)

**In a hurry?**

Call your Visa or Master/Charge  
order in to:

**800-631-8112**

(In NJ, call 201-540-0445)

Please rush me the following back issues of ROM:  
issue (month)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- ( ) \$ 2.25 each postpaid
- ( ) 5.00 for 3 issues postpaid
- ( ) 14.00 for all 9 issues postpaid
- ( ) Cash, check, m.o. enclosed

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Send to: Creative Computing, P.O. Box 789-M, Morristown, NJ 07960



## ★ ★ ★ ★ ★ The Best of BYTE ★ ★ ★ ★ ★



This is a blockbuster of a book containing the majority of material from the first 12 issues of *Byte* magazine. The 146 pages devoted to hardware are crammed full of how-to articles on everything from TV displays to joysticks to cassette interfaces and computer kits. But hardware without software might as well be a boat anchor, so there are 125 pages of software and applications ranging from on-line debuggers to games to a complete small business accounting system. A section on theory examines the how and why behind the circuits and programs, and "opinion" looks at where this explosive new hobby is heading.

Softbound, 386 pages, \$11.95 plus \$1 shipping and handling in U.S. (\$2 foreign).

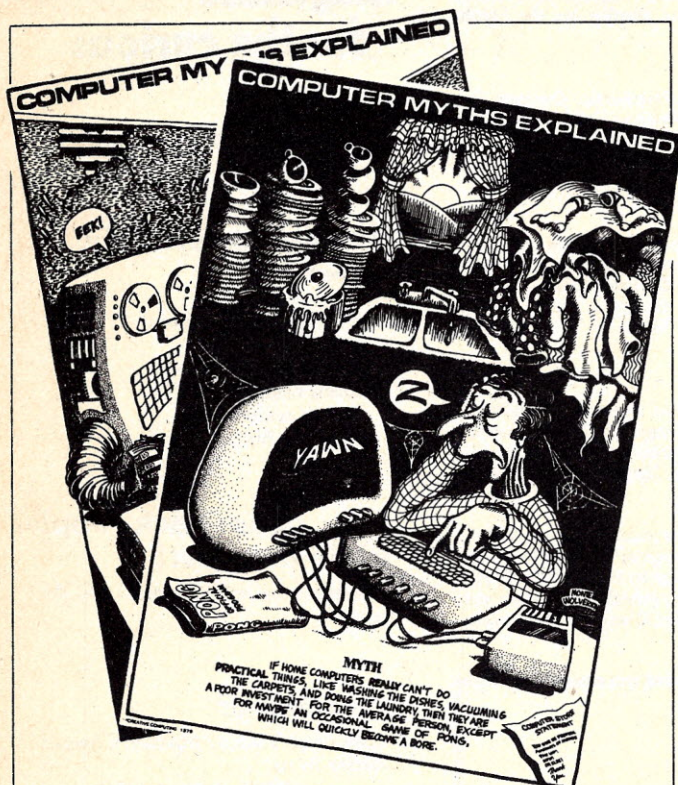
Send to Creative Computing, P.O. Box 789-M, Morristown, N.J. 07960. Residents of the Garden State add 5% tax. Orders must be prepaid.

For faster service, call in your bankcard order to:

**800-631-8112**

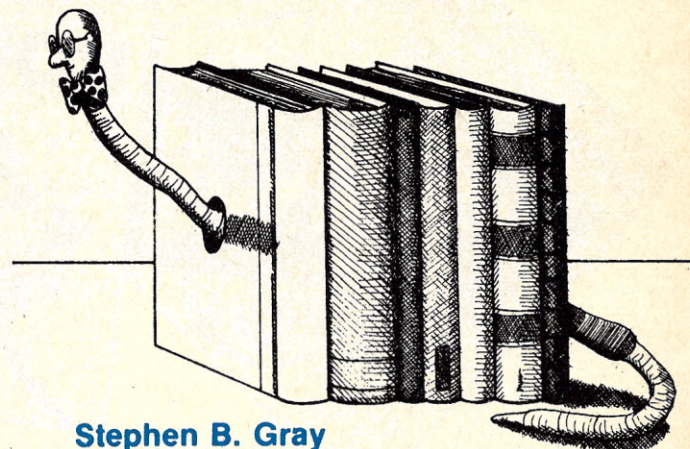
(In N.J., call 201-540-0445)

**creative computing**



**Set of 8 computer Myths Explained** by Monte Wolverton. On heavy stock, large 12x17" size, suitable for framing, dressing up that drab line printer or file cabinet. Only \$3.00 postpaid in USA, \$4.00 foreign. A real megabargain! Send to Creative Computing, P.O. Box 789-M, Morristown, N.J. 07960. Residents of the Garden State add 5% tax. Orders must be prepaid.

# Reviews



**Stephen B. Gray**

**Computers, Computers, Computers: In Fiction and in Verse**, edited by Dennie Van Tassel. Thomas Nelson Inc., New York. 192 pages, hardcover \$6.95. (Available from Creative Computing Book Service.)

The 18 items here, consisting of three poems and 15 stories, won't please everybody, but they'll go a long way toward it. The big winners are, naturally, by the professional SF writers, including Scheckley, Heinlein, and Malzberg. The rest are a mixed bag, from Art Buchwald to Bob Elliott and Ray Goulding. Only a couple are somewhat dull, and that's not a bad score.

Each item is headed by one of Gloria Maxson's "Glorobot" limericks from *Datamation*. Some are interesting, most try too hard, and a couple are good.

The winners here are Frederic Brown's 1954 classic "Answer," Richard T. Sandberg's "The Perfect Crime," Gordon R. Dickson's "Computers Don't Argue," Robert A. Heinlein's "That Thinkum Dinkum," Mack Reynolds "Criminal in Utopia" and Barry N. Malzberg's "The Union Forever."

That's a totally subjective choice, of course, but if you don't (or wouldn't) like at least half of these, you're probably not a subscriber to *Creative Computing*.

If you call yourself a computer freak, or if you want a good idea of what's being done with computers in creative writing, this modestly-priced volume belongs on your bookshelf.

\*\*\*\*

**BASIC With Style: Programming Proverbs**, by Paul Nagin and Henry F. Ledgard. Hayden Book Co., Inc., Rochelle Park, NJ. 144 pages, paperback \$5.95. 1978.

This latest addition to Henry F. Ledgard's series of programming style guides "is intended for BASIC programmers who want to write carefully constructed, readable programs," just as previous books in the series were intended for COBOL and FORTRAN programmers.

The 19 proverbs are divided into four groups, and are all worth repeating here: A good start is half the race (don't panic; define the problem completely; start the documentation early; think first, code later; proceed top-down; beware of other approaches), keeping logical structure (code in logical units; use functions and subroutines; watch out for GOTOs; prettyprint), coding the program (comment effectively; get the syntax correct now; don't leave the reader in the dust; produce good output; hand-check the program; prepare to prove the pudding), and of course ... (have someone else read the work; read the manuals again; don't be afraid to start over!).

The proverbs are illustrated with many examples of poor solutions and good ones. Other chapters are on top-down programming, program standards, and "odds and ends" such as recursion and the case against program flowcharts.

This belongs on the bookshelf of every serious BASIC programmer.



**Sixty Challenging Problems with BASIC Solutions**, by Donald D. Spender. Camelot Publishing Co., Box 1357, Ormond Beach, FL 32074. 80 pages, paperback \$6.95. 1977. (Available from Creative Computing Book Service.)

"This book contains sixty games, puzzles, mathematical recreations, science problems, and business problems for reinforcing computer programming skills. It gives the reader a chance to measure his or her programming skills against some interesting problems that lend themselves to computer solution—many would be very time-consuming to solve by hand computation. . . . None require more than a working knowledge of elementary algebra," according to the preface.

The 60 problems include greatest common divisor, N-factorial, coin-tossing, Tower of Hanoi, sum of two squares, Fibonacci numbers, prime numbers, perfect numbers, compounded interest, grade average, I am thinking of a number, population, Chinese remainder theorem, craps probability, and magic squares.

Each problem is defined very clearly, and some include hints. The second half of the book provides the solutions, all reproductions of Teletype printout, full-size and new-ribbon legible, a rare combination. Forty of the LISTs are accompanied by RUNs.

This excellent book, recommended for either school or personal use, is also available as 14-by-21.6-cm cards, with cartoon characters and drawings to illustrate the problems; 66 cards for \$6.95.

\*\*\*\*\*

**Basic Programming for Computer Literacy**, by David Mour-sund. McGraw-Hill Book Co., New York, NY. 279 pages, paperback \$10.95; teacher's manual available. 1978.

After a brief introduction, the author, who is a professor of computer science at the University of Oregon, jumps right into Reading Basic Programs with a full page of computer output from a PDP-10, with log on, library fetch, LIST and RUN. Once more, as so many authors have done, this is giving too much too soon, even though the program is all REM and PRINT lines. If the book is used in a course, the instructor can soften the impact of eight half-page or full-page printouts within ten pages. But the solitary reader may be overwhelmed.

Chapter 4, Modifying Basic Programs, comes before the chapter on Writing Simple Programs. Such a sequence means the text was written, as the preface says, "to facilitate learning by doing. . . . students using this text should be expected to make extensive use of a computer." The solitary reader is advised to start with Chapter 5, and read the first four chapters later.

Chapter 8 is on Character String Primitives, a recondite phrase that could surely have been simplified. Other chapter headings are Repetition, Stepwise Refinement, Simulation, Some Basic Shorthand, Search and Sorting, Well-written Programs, etc.

The writing is rather heavy-handed, and the book is best used in the classroom. For the solitary reader, many better books abound.

\*\*\*\*\*

**A Quick Look at BASIC**, by Donald D. Spender. Camelot Publishing Co., Box 1357, Ormond Beach, FL 32074. 64 pages, paperback \$5.95. 1977.

Here's a very good example of how to write a book on the elements of BASIC in only 64 pages and four chapters. The book, according to the preface, "is intended to serve as a self-instructional text designed for either the reader who has little or no knowledge of computers or computer programming, or for the person who wants to learn BASIC quickly." It serves that purpose quite well.

The chapters are on Getting Started (covering LET, PRINT, INPUT, END), Control Statements and Looping (GOTO, IF/THEN, FOR/NEXT), Additional BASIC Concepts (READ, DATA, STOP, RESTORE) and Array Handling (DIM). The programs presented as examples are all fairly short and easy to understand. Each chapter includes from a dozen to four dozen exercises, most of which require writing programs; no answers are given. A variety of light-hearted illustrations helps keep things from getting too serious.

The author has written over 30 books on computers and programs, and this short one reflects once more his ability to present much information in a little space, succinctly and simply.

## Programmer's Guides for the PET™

TIS

### WORKBOOKS FOR THE COMMODORE PET 2001

**Getting Started with Your PET** WB-1 \$4.00

Covers the fundamentals of PET BASIC: calculator and program mode, data input and output, data representation, program storage on the cassette.

**PET String and Array Handling** WB-2 \$3.95

Covers string and substring search, concatenation, replacement and manipulation.

**PET Graphics** WB-3 \$4.95

Covers use of cursor control and special graphics symbols to draw plots, histograms, and sketches.

**PET Cassette I/O** WB-4 \$4.95

Covers OPEN, CLOSE, string and numeric data files.

**Miscellaneous PET Features** WB-5 \$3.95

Covers the clock, random number generator, upper and lowercase alphabetic characters, saving memory space, etc.

**PET Control and Logic** WB-6 \$3.95

Covers IF, GOSUB, logical operations, and ON X.

Add \$1.50 for shipping and handling.

Dealer  
Inquiries  
Invited

TIS  
P.O. Box 921  
Los Alamos, NM 87544  
Money back guarantee

We also sell PET Software. Write for details.

PET is a trademark of Commodore Business Machines

CIRCLE 180 ON READER SERVICE CARD

# PROGRAMMING SUPPORT FOR GROWN-UPS

- Full C compiler for RT-11, RSX-11M, UNIX, RSTS/E, IAS.
- Full C cross-compiler for 8080, with narrative assembler.
- Portable runtime library with 75 functions.
- System library giving access to all directives.
- Continuing maintenance and training available.

An affordable alternative to Assembler, Pascal, or Fortran, at \$500 per binary license.

## Whitesmiths, Ltd.

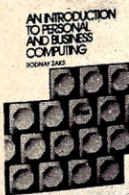
127 East 59th Street · New York NY 10022 · 212 799-1200

CIRCLE 204 ON READER SERVICE CARD



**SYBEX**

# LEADER IN MICROCOMPUTER EDUCATION



## AN INTRODUCTION TO PERSONAL AND BUSINESS COMPUTING

by Rodnay Zaks  
250 pp, ref C200 \$6.95  
The basic introductory text on microcomputers, with a detailed evaluation of the features and peripherals required for specific applications. No prior computer knowledge required.

## MICROPROCESSORS: from Chips to Systems

by Rodnay Zaks  
420 pp, ref C201 \$9.95  
An educational text, used worldwide at universities and in industry designed to teach all the fundamentals of microprocessors, the assembly of a system, and its use.



**PROGRAMMING THE 6502**  
by Rodnay Zaks  
320 pp, ref C202 \$10.95  
An introductory programming text for the 6502. Does not require any prior programming knowledge. From arithmetic to interrupt-driven input-output techniques.

**6502 APPLICATIONS BOOK**  
by Rodnay Zaks  
ref D302 \$12.95  
Actual application programs to interface the 6502 to the real world, from LED to motor, and analog-digital conversion. Available Shortly



## MICROPROCESSOR INTERFACING TECHNIQUES

Austin Lesea and Rodnay Zaks  
416 pp, ref C207 \$11.95  
All the basic interfacing techniques, from keyboard to floppy disk, including the standard buses (S100 to 1EEE488).

## MICROPROCESSOR LEXICON

120 pp, ref X1 \$2.95  
Dictionary and tables. All the definitions of the microprocessor world in a pocket book format.

## MICROPROGRAMMED APL IMPLEMENTATION

330 pp, ref Z10 \$25.00  
How to design an APL interpreter.



## SELF STUDY COURSES ON CASSETTES

Ten courses to study at home or in the car. The most time-efficient way to learn. Includes workbook and cassettes.

**INTRODUCTORY** \$29.95 ea  
S1-INTRODUCTION TO MICROPROCESSORS (2.5 hrs)  
S2-PROGRAMMING MICROPROCESSORS (2.5 hrs)

**COMPREHENSIVE** \$59.95 ea  
SB1-MICROPROCESSORS (12 hrs)

SB2-MICROPROCESSOR PROGRAMMING (10 hrs)

**SPECIALIZED** \$49.95  
SB7-MICROPROCESSOR INTERFACING (6 hrs)

## TO ORDER

By phone: 415 848-8233, Visa, MC, Amer Express  
By mail: circle books on ad. Include payment.  
Shipping: add \$1.50 per book (UPS) or 65¢ (4th class - allow 4 weeks). Double for cassettes and overseas.  
Tax: in California add tax.  
CCS

FREE DETAILED CATALOGUE

AVAILABLE AT BOOKSTORES, COMPUTER, AND ELECTRONIC SHOPS EVERYWHERE



2020 Milvia Street  
Berkeley, CA 94704  
Tel 415 848-8233 Telex 336 311

CIRCLE 178 ON READER SERVICE CARD

**How You Can Learn to Live With Computers**, by Harry Kleinberg. Penguin Books, New York. 216 pages, paperback \$2.95. 1978.

Originally published in hardcover at \$8.95 by Lippincott in 1977, this book doesn't quite live up to the back cover's claim that "You can understand computers" if you take that to mean understanding how computers work. Computer technology is covered briefly and lightly in a few dozen pages in the first six chapters, and gets no more complex than describing a simple program to determine how much wallpaper is required for a room of given dimensions, or showing how a pair of switches can constitute an AND gate.

The author looks into logic, memory, programming, computer arithmetic, nanoseconds, systems analysis, and the future, in a simple style any high school freshman should be able to understand, although the book seems to be written for adults.

Kleinberg could certainly go into great detail on the technology, as he's a computer engineer at RCA. But what he's trying to do here is "dispelling myths and fears," the back cover puts it, by showing how basically simple computers are, "that they cannot solve problems, think or make decisions..." and that their powers are always curtailed by the limitations of the people who program them."

In this context, Kleinberg succeeds quite well, writing in an easy-going manner and including many personal anecdotes that go a long way toward demolishing the mystique that many of us may have willingly helped create.

\*\*\*

**DEBUG: An 8080 Interpretive Debugger**, by Christopher A. Titus and Jonathan A. Titus. Howard W. Sams & Co., Inc., 4300 West 62 St., Indianapolis, IN 46268. 104 pages, paperback \$4.95. 1978.

Originally published under the same title by E&L Instruments, this book provides documented listings, in both octal and hex, for a debugging program that lets you enter an 8080 assembly-language program into memory and single-step through it, instruction by instruction.

If you have an Altair 8800 or a similar computer, with front-panel switches and lights, you could do the same, but DEBUG also lets you examine the 8080's internal registers. So as you single-step, you can check out the effect of a particular instruction on each of the 8080's registers, the memory location addressed by registers H and L, the stack pointer and the last two entries on the stack.

Unlike a hardware single-step, where an 8080 usually steps through individual instruction cycles, DEBUG steps through one complete instruction, regardless of the number of cycles required. DEBUG can also read and punch a paper tape using a teletypewriter, so you can save your program once you get it working. The I/O routines can be easily changed so you can use an audio cassette or CRT terminal.

DEBUG resides in only 1K of memory, so it lacks some features other debuggers have. But for \$4.95, you get quite a bargain.

\*\*\*\*

**An Introduction to Microcomputers: Volume O—The Beginner's Book**, by Adam Osborne. Osborne and Associates, Inc., Box 2036, Berkeley, CA 94702. 237 pages, paperback \$7.95. 1977. (Available from Creative Computing Book Service.)

Volumes I and II in this series were greeted enthusiastically by hobbyists when they were published a couple of years ago. By bit-hacker hobbyists, that is; people with either an engineering background or the willingness to dig into a rather advanced text. It wasn't long before word got back to perspicacious OA president Adam Osborne that a wider audience could be reached with a lower-level preparatory volume, and he promptly filled the gap. As the introduction says, "After reading this book, you will be ready to move on to 'Volume I—Basic Concepts.'"

The six chapters of this thin volume are packed with photographs, drawings, flowcharts and examples to help the beginner as much as possible. The chapters cover basics (microcomputer system, records and files), using a microcom-



puter, system components, numbers and logic, programming and hardware, and Putting It All Together (word size, ALU, timing, memory).

Although called "The Beginner's Book," this is not for the casual reader who wants to learn a few concepts. It's for the person who really wants to know all about what makes a microcomputer tick, from status flags to rollover, from assemblers to XOR. For the beginner who wants to know it all, this is the best book he can get.

\*\*\*\*\*

**The Incredible Secret Money Machine**, by Don Lancaster. Howard W. Sams & Co., Inc., 4300 W. 62nd Street, Indianapolis, IN, 46268. 159 pages. \$5.95 in paperback.

Mr. Lancaster's book is subtitled **A HOW-TO COOK-BOOK FOR SETTING UP YOUR OWN COMPUTER, CRAFT, OR TECHNICAL BUSINESS**. Well, partly it is and partly it ain't. In addition to some pretty good advice on that subject, both general philosophy and specific detail, there are discussions of investment policy and tax gimmicks, tips on writing for publication, some personal prejudices, anecdotes, cartoons and a celebration of the counter culture life style.

The last point, the life style, may be the biggest flaw in the book since it sets a tone that will put a lot of people off. The author tells you up front what he considers the basic qualification to start a successful small business: "first, you have to be heavily into a technical or craft trip on a total lifestyle basis." The unspoken implications are that you are ready to cut all ties to the work-for-wages environment and are prepared to devote full time to your one-man (or woman) business.

This idea is reinforced by the author's examples. Every business he mentions has some side line but it is never working for wages or anything else remotely ordinary.

The image of the brave free spirit dropping out of the rat race to make it in glorious independence may be just what your ego needs. On the other hand, it may scare the hell out of you. There are those house payments and the orthodonture for the kids. Well, forget all that. It's just Mr. Lancaster riding his mania. Within 5 desks of where I sit, writing this on my lunch hour in a corporate aerospace giant, there's a dealer in specialty jewelry, two apartment house owners, a guy who does something strange with property condemned for freeway routes, one microcomputer entrepreneur and a software consultant. In several of those cases the 8-hour a day gig is now their sideline. So it isn't necessary to cut those establishment ties just yet.

With that out of the way you can consider the content of the book a little more objectively, and it's pretty darn good. The fact is that a high degree of dedication, bordering on mania, is necessary to start your own business. And it probably is worse if you're doing it in parallel with a conventional job or profession.

There's a limit to how specific a book like this can be since the number of possible businesses is endless and each has its peculiarities. Within those limits the author gives good general guidelines on getting started, keeping control, and staying out of trouble.

Every now and then his personal prejudices get in the way when dealing with specific details. One example is his contention that a post office box number for your business address projects a professional image. If there's anything that flags an operation as a garage it's a box number address. Then there is his idea that you do everything yourself, even to doing your own typing since that's where you spot the errors in your writing. Not true. For many of us that's where you spot the errors in your typing - and where you burn two hours doing a job poorly that a real typist will turn out perfectly in 10 minutes.

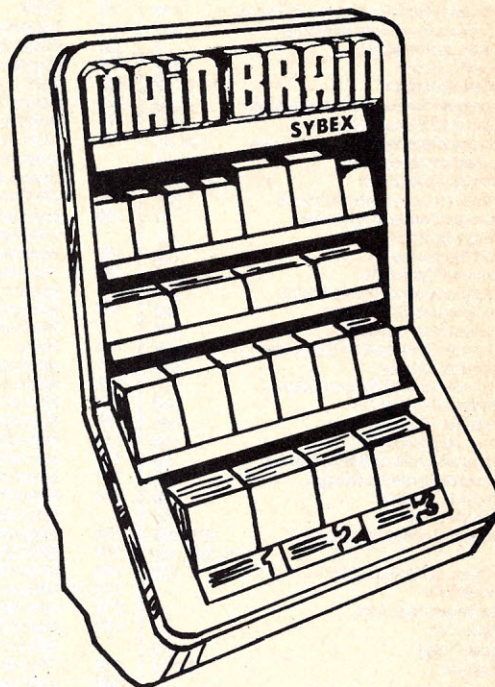
Which says, I suppose, that nobody is perfect. Mr. Lancaster, however, despite a few goofs, is way above average.

So if you're really serious about starting that business in the unused bedroom, invest \$5.95 and help Mr. Lancaster out with his business. Or better yet, follow his advice: borrow a copy and xerox the parts that interest you. You have to start keeping those costs down sometime.

A.H. McDonough

# ComputerLand®

## INTRODUCES:



See us at booth #530E at the West Coast Computer Faire.

## MAIN BRAIN

### THE ONE - STOP CENTER FOR BOOKS, SELF-STUDY COURSES AND OTHER EDUCATIONAL MEDIA ON PERSONAL COMPUTING.

"MAIN BRAIN" IS A TRADEMARK OF COMPUTERLAND, INC.

PRESENTED BY:

### SYBEX

### THE LEADER IN COMPUTER EDUCATION

CCS

2020 MILVIA STREET, BERKELEY, CA 94704 415/848-8233

CIRCLE 201 ON READER SERVICE CARD





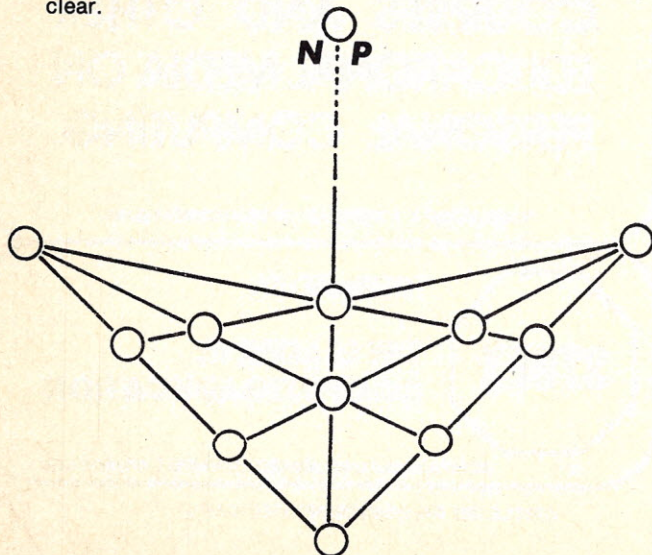
## INDEX TO ADVERTISERS

| RS      |                                  | Pg.         | RS      |                                    | Pg.    | RS      |                                   | Pg.        |
|---------|----------------------------------|-------------|---------|------------------------------------|--------|---------|-----------------------------------|------------|
| 102     | ABS Software                     | 153         | 174     | Electronic Systems                 | 111    | 131     | Osborne & Associates              | 113        |
| 199     | Advanced Computer Products       | 107         | 198     | Exidy                              | 13     | 185     | Otto Electronics                  | 139        |
| 103     | Advanced MicroComputer Systems   | 146         | 150     | FMG                                | 99     | 155     | Percom                            | 149        |
| 164     | Affordable Business Systems      | 152         | 214     | Forethought Products               | 142    | *       | Personal Computer World           | 162        |
| 200     | Aladdin Automation               | 7           | 150     | Frazer & Associates                | 152    | 190,191 | Personal Programming Services     | 147,161    |
| 105     | Alpha Products                   | 148         | 153     | Gaudeus Magazine                   | 71     | 108,167 | Personal Software                 | C3,121,144 |
| 148     | Apple Computers                  | 77          | 152     | GRT                                | 17     | 163     | Plainsman Micro Systems           | 117        |
| 157     | Automated Resource Management    | 153         | 117     | Hobby World Electronics            | 145    | 187     | Practical Applications            | 128        |
| 209     | Automated Simulations            | 148         | 118     | Holistic Data                      | 152    | 208     | Processor Technology              | 31         |
| 104,144 | Berkeley Medical Data Associates | 121,65      | 151     | HUH Electronics                    | 131    | 188     | Programma International           | 91         |
| 149     | The Bottom Shelf, Inc.           | 11          |         | Interactive Data Systems           | 42     | 135     | Quality Software                  | 130        |
| 110     | Brahman Diversions               | 152         | 109     | Ithaca Audio                       | 8,9    | 123     | Rainbow Computing, Inc.           | 63         |
| 113     | Brunswick Computer Software      | 161         | 160     | JM Overholzer                      | 87     | 165     | RCA                               | 81         |
| 115     | Business Computing Review        | 51          | 156     | Lee Mathews & Associates           | 157    | 189     | Reliance Plastics & Packaging     | 154        |
| 116     | CAP Electronics                  | 127         |         | Lifeboat Associates                | 64     | 192     | Sat Trak International            | 150        |
| 134     | Cload Magazine                   | 128         | 162     | Mad Hatter Software                | 35     | 206     | Simplexity Software Systems, Inc. | 151        |
| 120     | Computer Corner NJ               | 142         | 161     | The Mail Mart                      | 154    | 213     | Skyles Electronic Works           | 138        |
| 119     | Computer Corner White Plains     | 153         | 171     | Malibu Design Group                | 41     | 186     | SSI Publications                  | 39         |
| 122     | The Computer Exchange            | 140         | 137     | Marketline Systems                 | 149    | 193     | Small Business Applications       | 33         |
|         | The Computer Factory             | 137         |         | Measurement Concept Corp.          | 161    | 194     | Small Business Computers          | 55         |
| 126     | Computer Information Exchange    | 153         | 184     | Meca                               | 53     | 121     | Small System Software             | 95         |
|         | Computer Lab NJ                  | 140         | m*      | McGraw/Hill Computer Professionals | 25     | 125     | Smoke Signal Broadcasting         | 2          |
| 128     | Computerland of Bergen County    | 150         | 127     | Micro Ap                           | 79     | 196     | Softape                           | 97         |
| 154     | Computer Mart of CA              | 146         | 172     | MicroComputer Devices              | 45     | 136     | Software-80                       | 47         |
| 129     | Computer Mart Systems            | 136         | 195     | MicroComputer World                | 128    | 139     | Southwest Technical Products      | C2         |
| 132     | Computer Services                | 130         | 173     | MicroDaSys                         | 30     | 178,201 | Sybox                             | 166,167    |
| 124     | Computer Store of Santa Monica   | 55          | 175     | MicroFantastic Programming         | 155    | 130     | Tarbell Electronics               | 141        |
| 140     | Computer Systems Design          | 135         | 177     | Micro Mike's                       | 135    | 202     | Telesensory Systems, Inc.         | 143        |
| 112     | Computer Textile                 | 42          | 179     | MicroPro International             | 91     | 138     | Terminal Sales & Development      | 141        |
| 141     | Computronics                     | 69          |         | MicroSoft                          | 21     | 143     | Tiny-C                            | 87         |
| 166     | Connecticut MicroComputer        | 123,124     | 133     | Midwest Scientific Instruments     | 15     | 180     | Total Information Services        | 165        |
|         |                                  | 125,126,127 | 176     | Mini Micro Mart                    | 115    | 207     | TRS-80 Software Exchange          | 105        |
| 111     | Continental Specialties          | 109         | 181     | Mountain Hardware                  | 144    | 142     | U.S. Brokers                      | 154        |
| 114     | Cromemco                         | 1           | 159,211 | Netronics R&D Ltd.                 | 33,103 | 203     | Vector Graphics                   | 19         |
| 145     | Data Decisions Corp.             | 42          | 210     | New England Electronics            | 119    | 204     | Whitesmiths, Ltd.                 | 165        |
| 101     | Datasearch                       | 64          | 182     | North Star Computers               | 5      | 205     | World Power Systems               | 56-61      |
|         | Digital Press                    | 76          |         | NRI Schools—Electronics Division   | 27     |         |                                   |            |
| 147     | Dynabyte                         | 84-85       | 146     | Ohio Scientific                    | C4     |         |                                   |            |
|         |                                  |             | 183     | Omnibus Data Supplies              | 121    |         |                                   |            |

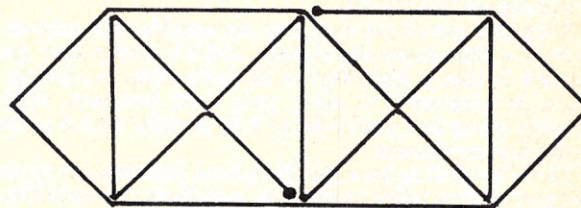
\* Direct Correspondence Requested.

### Puzzle Answers

- Part 1: The North Pole. Part 2: He travels a quadrant of the earth multiplied by the square root of two, or, 14,140,000 meters. (Approximately).
- Unfortunately, you cannot arrange eleven of anything into seven rows of four each. However, the key to the problem is in the way that it is stated, namely, "that the eleven sleds lay in such a way that there were seven rows of sleds...". One of those rows was very long stretching all the way back to the sled that the explorer had abandoned at the north pole. The drawing below will make everything painfully clear.



3.



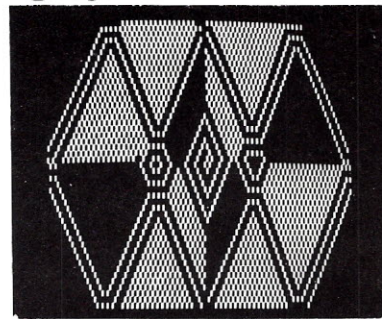
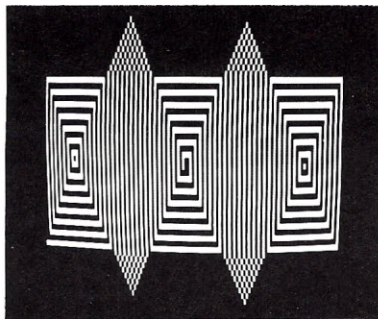
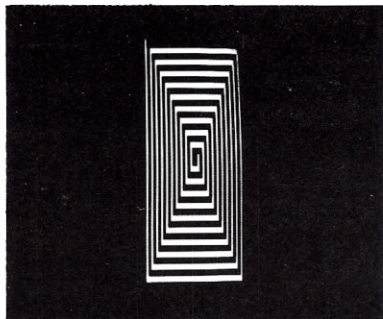
4.  $123 - 45 - 67 + 89 = 100$ .

- In problem 1 we change the five to a "square root" operation. In problem 3 we change the two to the sign for "PI".  $22/7$  was an approximation for "PI" used in times gone by. The rest of the answers speak for themselves.

- The Captives in The Tower** — The boy descended first, using the cannonball as a counterpoise. The queen and her daughter then took the cannonball out of the upper basket, and the daughter descended, the boy acting as counterpoise. The cannonball was then allowed to run down alone. When it reached the ground, the daughter got into the basket along with the cannonball, and their joint weight acted as counterpoise while the queen descended. The princess got out and the cannonball was sent down alone. The boy then went down, the cannonball ascending. The daughter removed the cannonball and went down alone, her brother ascending. The latter then put the cannonball in the opposite basket, and lowered himself to the ground.

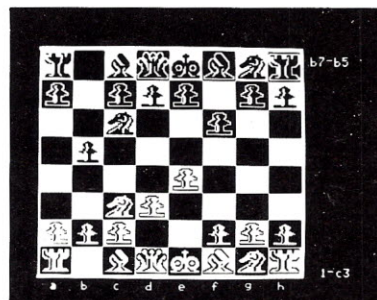
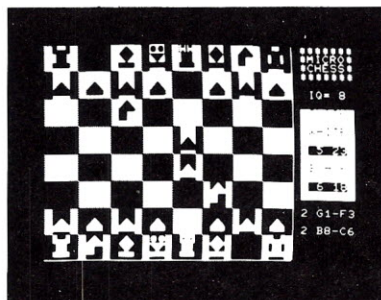
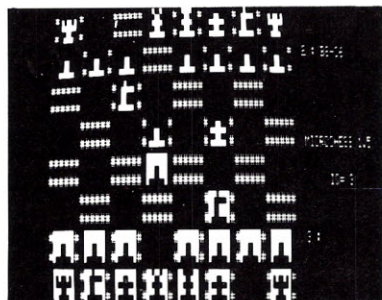


# PET / TRS-80 / APPLE: Personal Software brings you the finest!



**NEW! THE ELECTRIC PAINTBRUSH** by Ken Anderson for 4K Level I and II TRS-80s: Create the most dazzling graphics displays you have ever seen with a minimum of effort. *The Electric Paintbrush* is actually a simple 'language' in which you can write 'programs' directing your paintbrush around the screen—drawing lines, turning corners, changing white to black, etc. Once defined, these programs may be called by other programs or repetitively executed, each time varying the parameters of brush movement.

The machine language interpreter executes your programs almost instantaneously, allowing you to create real-time, animated graphics displays. The screen photos above are actually 'snapshots' of the action of a single one-line program over about thirty seconds. Mesmerize your friends with visual effects they've never seen on a TV screen! There's no limit to the variety of exciting and artistic graphics displays you can create with *The Electric Paintbrush*. And it's available now for only ..... **\$14.95**



**MICROCHESS** is the culmination of two years of chessplaying program development by Peter Jennings, author of the famous 1K byte chess program for the KIM-1. MICROCHESS 2.0 for 8K PETs and 16K APPLES, in 6502 machine language, offers 8 levels of play to suit everyone from the beginner learning chess to the serious player. It examines positions as many as 6 moves ahead, and includes a chess clock for tournament play. MICROCHESS 1.5 for

4K TRS-80s, in Z-80 machine language, offers 3 levels of play (both Level I and Level II versions are included and can be loaded on any TRS-80 without TBUG). MICROCHESS checks every move for legality and displays the current position on a graphic chessboard. You can play White or Black, set up and play from special board positions, or even watch the computer play against itself! Available now at a special introductory price of only ..... **\$19.95**

**BRIDGE CHALLENGER** by George Duisman for 8K PETs, Level II 16K TRS-80s, and 16K APPLES: You and the dummy play 4 person Contract Bridge against the computer. The program will deal hands at random or according to your criterion for high card points. You can review tricks, swap sides or replay hands when the cards are known. No longer do you need 4 people to play! ..... **\$14.95**

**TIME TREK** by Brad Templeton with sound effects for 8K PETs is **Personal Software's** answer to the proliferation of Star Trek games. This is a real time action battle game which requires fast thinking as well as sharp wits. There are no 'turns' in *Time Trek*: your scanners and ship's status report are constantly updated on the screen, and you can enter commands as fast as you can press the keys. You use your shields, phasers and photon torpedoes against enemy Klingons in a game where you can move, steer and fire at the same time. Star Trek aficionado or not, you'll appreciate the excitement and excellence of this real time game. .... **\$14.95**

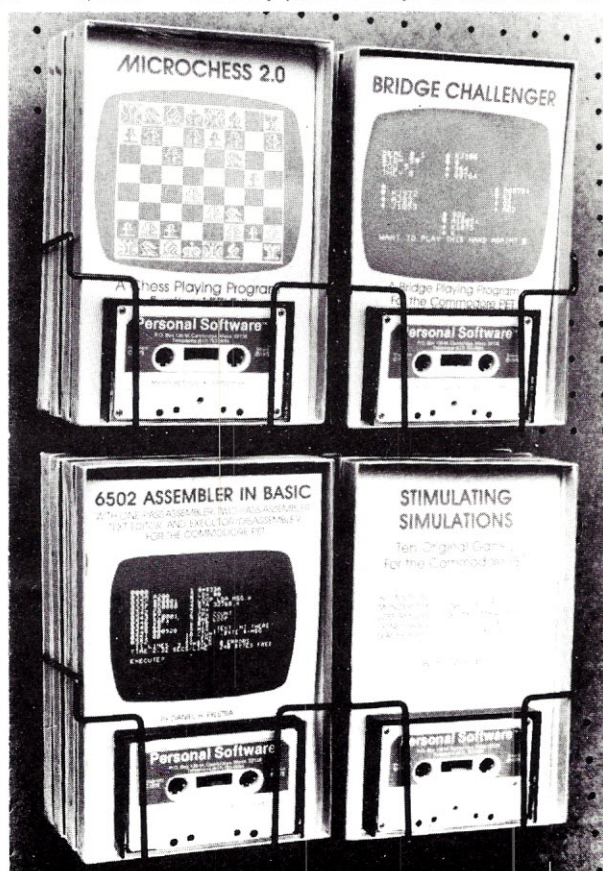
**WHERE TO GET IT:** Look for the **Personal Software™** display rack at your local computer store. Over 275 dealers now carry the **Personal Software™** line—more than any other brand. If your local dealer doesn't already carry **Personal Software™** products, ask him to call us at (617) 782-5932. Or you can order direct from us by check, money order or VISA/Master Charge. If you have questions, please call us first at (617) 783-0694. If you know what you want and have your VISA/MC card ready, you can use any telephone to

**DIAL TOLL FREE**  
**1-800-325-6400**  
24 hrs In Missouri dial 1-800-342-6600 7 days

Or you can mail your order to the address below. To add your name to our mailing list for free literature and announcements of new products, use the reader service card at the back of this magazine.

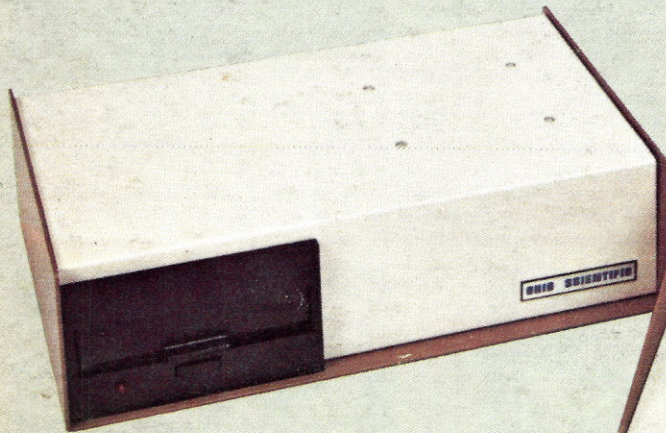
## Personal Software™

P.O. Box 136-C4, Cambridge, MA 02138





# Here it is at last... **THE FIRST FLOPPY DISK BASED COMPUTER FOR UNDER \$1000**



The C1P MF  
**\$995**



- Complete mini-floppy computer system
- 10K ROM and 12K RAM
- Instant program and data retrieval

The Challenger 1P Mini-disk system features Ohio Scientific's ultra-fast BASIC-in-ROM, full graphics display capability and a large library of instant loading personal applications software on mini-floppies including programs for entertainment, education, personal finance, small business and now *home control*!



The C1P MF configuration is very powerful. However, to meet your growth needs it can be directly expanded to 32K static RAM and a second floppy by simply plugging these options in. It also supports a printer, modem, real time clock and AC remote interface as well as the OS-65D V3.0 development oriented operating system.

## Or Start with the C1P CASSETTE BASED Computer for just \$349.

The cassette based Challenger 1P offers the same great features of the mini-disk system including a large software library except it has 4K RAM and conservative program retrieval time. Once familiar with personal computers, you'll be anxious to expand your system to the more powerful C1P MF.

You can move up to mini-disk performance at any time by adding more memory and the disk drive. Contact your local Ohio Scientific dealer or the factory today.

\*Both systems require a video monitor, modified TV or RF converter and home television for operation. Ohio Scientific offers the AC-3 combination 12" black and white TV/monitor for use with either system at \$115.00 retail.

All prices, suggested retail.

# OHIO SCIENTIFIC

1333 S. CHILlicothe RD., AURORA, OHIO 44202 (216) 562-3101